MODERN PRACTICAL ARITHMETIC

PRIMARY

Fred De Miro

MODERN PRACTICAL ARITHMETIC

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PRIMARY

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INTRODUCTION

THIS edition of the Watson and White Arithmetics has been prepared to conform to the newer syllabi, which, as they appear from time to time, place a new emphasis upon some particular phase of arithmetic study and teaching. The superior features of former editions have been retained. Great care has been taken to provide proper presentation of all the fundamental processes and abundant exercises for thorough drill.

Frequent drills, mental tests, and lessons in review preserve the cumulative plan which is a distinctive feature of the Watson and White Arithmetics.

The relation of factor and product has been developed with extreme care and is so presented that it becomes a vital part of the child's mathematical sense.

Along with a realization of the preëminent usefulness of arithmetic in the everyday affairs of life, the authors have had constantly in mind also the fact that arithmetic is the path by which the student enters the greater field of general mathematics. It is essential to the student's further progress that facts and processes as presented in his arithmetic course shall conform to those he is to meet in his later study.

The problem study should not be confined to material contained in the book. It is essential that real problems be brought in from the immediate community upon which pupils may try their skill.

As a rule, projects are suggested rather than given in detail because, to be of greatest value, they must have

their origin in a local situation, — a store, a factory, a home, or a farm in the immediate community. The project should afford interesting practice in the processes already learned rather than serve as the main reliance in teaching new matter.

It is possible for all normal children to learn the fundamental facts of arithmetic. Some will learn them much more quickly than others. Some will be able to solve more difficult problems than others. The *Modern Practical Arithmetics* furnish material adapted to these various grades of ability. It is as grievous an error to permit the stronger pupils to pass along by meeting merely the minimum requirement, as to expect the weaker ones to perform tasks beyond their ability.

The child benefits most and takes greatest delight in solving problems from the world about him, which he or his teacher has brought to the class room to replace or supplement those of the text-book.

Over one hundred years ago, Thomas Dilworth in England and Nathan Daboll in America each called his arithmetic "The Schoolmaster's Assistant," — a significant title. It is the desire of the authors that these books shall be helpful assistants to the teachers of our time.

To the many teachers whose advice, suggestion, and contributions of material have aided in the preparation of this series the thanks of the authors are gratefully tendered.

SUGGESTIONS TO TEACHERS

TEACHERS using this book should familiarize themselves with the entire series, so that they may grasp the purpose of the primary approach.

In the drilling process, much use may be made of the child's play and social instinct.

Waste of time must be guarded against. A game in which number is merely incidental is expensive of time. It gives too much play with too little number. A game of baseball or bean bags is fine for recreation, but involves so little of numbers that it is unprofitable for drill purposes.

On the other hand, such games as those described in this text, where the game itself *is numbers*, can be made a most profitable means of drill.

The primary teacher who can utilize the play instinct of children effectively in rapid drill work, who can keep account of the successes and failures of individual children, who can lead the child to take an interest in his own progress, and assume responsibility for it, will not be disappointed in results.

TABLE OF CONTENTS

THIRD GRADE, FIRST HALF

	PAGE		PAGE
Notation	1	Roman Notation	41
The Combinations	2	Multiplication	42
Addition	3	Everyday Use of Numbers	62
Reading and Writing Numbers	20	Division	63
Addition	23	Measures	69
Finding an Addend	27	Mental Tests	74
Subtraction	28	Tests of Accomplishment	77
Telling Time	40		

THIRD GRADE, SECOND HALF

Addition Drill	80	Home Problems or "Projects"	132
Subtraction	86	Making Change	138
Making Problems	91	Problems with Numbers Omitted	140
Multiplication	94	Mental Tests	141
Division	107	Tests of Accomplishment	145
Drill in "Carrying"	116	Standardized Tests	147
Practice Exercises	126		
Factors and Product	129		
Problems in Measure	131		

FOURTH GRADE, FIRST HALF

Reading and Writing Numbers	155	Multiplication Drill	167
Roman Numerals	156	Factors and Product	168
United States Money	157	Review and Practice	170
Addition	158	Multiplication	171
Subtraction	162	Division	176
Sales Slips	165	Prime Factors	178
		Division	179

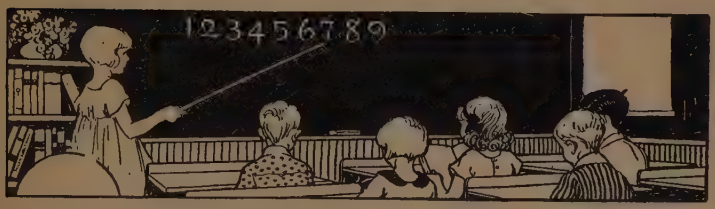
	PAGE
Drill	189
Fractions	
Halves	193
Fourths	195
Eighths	197
Fifths	200
Tenths	201
Thirds	203
Sixths	204
Twelfths	205
Measures	208
Solving Problems	212
Home Problems or "Projects"	217
Mental Tests	220
Tests of Accomplishment	224

FOURTH GRADE, SECOND HALF

Reading and Writing Numbers	226
Addition without a Pencil	231
Subtraction without a Pencil	233
Multiplication	235
Dividing Dollars and Cents	237
Fractions	245
Least Common Multiple	249
Least Common Denominator	251
Addition of Fractions	252
Subtraction of Fractions	255
Review	264
Cancellation	268
Tests	269
Reading Problems	270
Measures	274
Tests	277
Estimating Answers	278
Business Problems	279
Mental Tests	281
Tests of Accomplishment	287
Standardized Tests	294
Games and Devices	302
Tables of Denominate Numbers	306

MODERN PRACTICAL ARITHMETIC

THIRD GRADE — FIRST HALF



0 1 2 3 4 5 6 7 8 9

These figures are the **Arabic numerals.**

With them all the numbers used in arithmetic may be written. "0" is called "*zero.*"

1. *Read:*

26	55	80	68	29	37
14	15	32	43	10	56
41	39	75	97	36	60

2. *Write in figures:*

eighteen,	twelve,	sixty-five,
thirty-three,	forty-one,	ninety-four,
fifty-seven,	eleven,	eighty-six,
twenty-nine,	seventy,	sixty-six.

The Combinations

Read and give the answers quickly:

	a	b	c	d	e	f	g	h	i	j	k
1.	3	5	3	3	4	9	8	6	0	4	3
	2	1	3	1	4	2	2	3	6	1	0
2.	4	5	6	7	9	1	9	5	2	0	8
	3	4	2	2	4	1	3	3	1	0	5
3.	2	1	2	7	0	5	4	9	6	6	8
	2	0	5	7	4	5	2	8	1	4	4
4.	9	8	7	6	7	0	5	8	9	0	8
	5	0	4	6	3	2	2	1	9	9	7
5.	9	6	7	9	8	0	8	9	5	7	8
	6	5	6	1	8	7	3	7	0	1	6

Give the sums:

6.	5	3	6	0	4	9	2	7	1	8
	5	3	6	0	4	9	2	7	1	8

Try to give ten answers in ten seconds:

7.	9	4	5	8	9	7	8	9	7	4
	6	9	6	7	5	4	6	4	5	7
8.	8	9	6	2	9	6	5	7	3	6
	5	7	9	8	8	5	7	6	9	7
9.	7	5	2	6	3	5	4	7	4	8
	9	8	9	8	8	9	8	8	6	9

1. Eight books and four books are how many books?

$8 + 4 = 12.$

8 *and* 4 *are* 12.

This is an example in **addition.**

8 and 4 are the **addends.**

12 is the **sum.**

Read and give the sums:

2.	6	7	9	2	4	6	4	7
	6	3	5	7	8	5	4	8
3.	3	8	8	7	2	9	7	3
	5	5	8	5	3	7	6	3
4.	9	3	6	9	4	7	5	8
	9	8	2	6	5	7	2	9
5.	8	2	8	4	5	3	9	4
	2	2	6	9	5	4	2	6
6.	9	4	9	4	6	5	9	8
	3	2	8	7	9	8	4	7
7.	10	10	10	10	10	10	10	10
	6	8	4	5	9	2	7	3

?	?	?	?	?
6	9	7	4	2
12	12	12	12	12

Think "6 and 6 are 12
9 and 3 are 12
7 and 5 are 12
4 and 8 are 12
2 and 10 are 12."

Read, giving the missing number:

1.	?	?	?	?	?	?	?	?
	6	9	5	4	10	3	7	8
	12	12	12	12	12	12	12	12
2.	?	?	?	?	?	?	?	?
	4	5	3	8	6	1	7	2
	10	10	10	10	10	10	10	10
3.	?	?	?	?	?	?		
	8	5	7	10	6	9		
	14	14	14	14	14	14		
4.	?	?	?	?	?	?	?	?
	6	3	7	2	5	8	4	9
	11	11	11	11	11	11	11	11
5.	?	?	?	?	?	?	?	
	5	4	7	6	9	8	3	
	13	13	13	13	13	13	13	
6.	?	?	?	?	?			
	9	7	10	6	8			
	15	15	15	15	15			

1. Seven boys and five boys are how many boys?

2. Charles has six cents and Henry has ten cents. How many cents have they both?

3. A pencil costs five cents and a pen ten cents. How many cents do both cost?

4. Lucy worked four examples and Mary worked seven examples. How many examples did both work?

5. What is the sum of five and four?

6. Eight dollars and seven dollars make how many dollars?

7. Alice is six years old. Charles is five years older. How many years old is Charles?

8. Will bought a bicycle for nine dollars and sold it so as to make three dollars. How many dollars did he get for it?

9. What is the sum of nine and four?

10. One addend is six and the other is seven. What is the sum?

11. Three dollars and nine dollars are how many dollars?

Give three addition facts for 15.

7	9	10	Think
8	6	5	"8 and 7 are 15
15	15	15	6 and 9 are 15
			5 and 10 are 15."

2. Give five addition facts for 10.
3. Give three addition facts for 16.
4. Give four addition facts for 6.
5. Give five addition facts for 12.
6. Give five addition facts for 8.
7. Give four addition facts for 9.
8. Give three addition facts for 7.
9. Give four addition facts for 11.
10. Give three addition facts for 13.

? + ? = 14.
Think "what and what are 14?"
Say "7 and 7 are 14;
or 6 and 8 are 14;
or 9 and 5 are 14."

11.	? + ? = 11	16.	? + ? = 9	21.	? + ? = 13
12.	? + ? = 5	17.	? + ? = 18	22.	? + ? = 16
13.	? + ? = 3	18.	? + ? = 17	23.	? + ? = 8
14.	? + ? = 15	19.	? + ? = 10	24.	? + ? = 12
15.	? + ? = 7	20.	? + ? = 4	25.	? + ? = 6

6	This is an example in **addition.**
5	6, 5, and 3 are the **addends.**
3	14 is the **sum.**
14	Say "8(5 + 3), 14. The sum is 14."

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
9	8	6	4	6	3	4	8	8	2
4	4	3	5	4	6	3	2	2	5
5	4	4	3	2	2	7	6	7	3

11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
8	5	5	8	6	9	5	7	2	3
5	3	4	1	4	3	2	3	6	4
2	6	3	6	4	3	3	4	2	5

21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
8	6	3	9	3	8	2	2	4	3
3	2	6	4	3	1	4	3	4	3
7	5	3	3	4	4	6	4	6	5

31.	32.	33.	34.	35.	36.	37.	38.	39.	40.
7	7	9	8	7	4	4	6	3	2
4	5	3	3	0	2	1	2	1	2
4	5	6	2	4	7	9	7	4	3

41.	42.	43.	44.	45.	46.	47.	48.	49.	50.
8	6	5	3	3	9	6	9	2	4
5	7	6	0	1	2	2	1	0	2
3	2	4	4	5	7	3	8	4	8

1. Five men and four men are how many men?

Read and give the sums: make problems.

2.	6	9	8	4	7	1	3	0	5	2
	3	0	1	5	2	8	6	9	4	7

16			3
3	"16 and 3 are 19		16
19	3 and 16 are 19."		19

Read and give the sums:

3.	6	16	26	36	46	56	66	76	86	96
	3	3	3	3	3	3	3	3	3	3
4.	4	14	24	34	44	54	64	74	84	94
	5	5	5	5	5	5	5	5	5	5
5.	7	17	27	37	47	57	67	77	87	97
	2	2	2	2	2	2	2	2	2	2
6.	1	11	21	31	41	51	61	71	81	91
	8	8	8	8	8	8	8	8	8	8

4	14	24	34	44	54
4	4	4	4	4	4
8	18	28	38	48	58

Give the sums:

1.	24	84	74	94	**2.**	13	43	63	23
	4	4	4	4		3	3	3	3
3.	12	32	52	72	**4.**	22	42	72	32
	3	3	3	3		4	4	4	4
5.	25	76	34	52	**6.**	21	52	43	61
	3	2	3	5		6	6	5	5

7.	$32 + 2 =$	**8.**	$54 + 3 =$	**9.**	$22 + 5 =$
	$20 + 8 =$		$14 + 4 =$		$11 + 7 =$
	$35 + 3 =$		$42 + 6 =$		$70 + 8 =$
	$13 + 5 =$		$23 + 3 =$		$21 + 4 =$

10. There are 12 erasers at the blackboard. There are 6 new erasers on the teacher's desk. How many erasers are there in all?

11. Mary had saved 13 cents. On banking day, her mother gave her 5 cents more. How much money did Mary have for deposit?

12. The class have finished 11 examples in arithmetic. They have 7 more examples to do. How many examples are there in the lesson?

6		16
6	6 and 6 are 12 16 and 6 are 22	6
12		22

1. 26 and 6 = ? 66 and 6 = ?
36 and 6 = ? 76 and 6 = ?
46 and 6 = ? 86 and 6 = ?
56 and 6 = ? 96 and 6 = ?

2. 4 and 8 = ? 54 and 8 = ?
14 and 8 = ? 64 and 8 = ?
24 and 8 = ? 74 and 8 = ?
34 and 8 = ? 84 and 8 = ?
44 and 8 = ? 94 and 8 = ?

3.

5	15	25	35	45	55	65	75	85	95
7	7	7	7	7	7	7	7	7	7

4.

3	13	23	33	43	53	63	73	83	93
9	9	9	9	9	9	9	9	9	9

5.

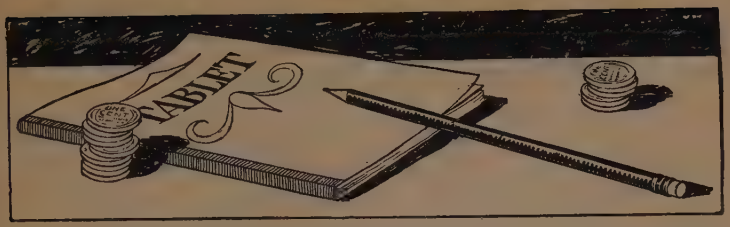
18	15	19	14	16	7	4	9	5	6
4	7	3	8	6	15	18	13	17	16

6.

25	33	67	86	54	6	4	3	5	3
7	9	5	6	8	26	38	49	27	69

7.

58	6	29	7	24	3	67	9	36	4
4	76	3	45	8	59	5	23	6	48



1. How many cents must I have to buy a tablet for 8 cents and a pencil for 5 cents?

The number of cents is the *sum* of 8 and 5, which is 13.

2. Ted sold 5 of his chickens. Then he had 5 left. How many had he at first?

3. Six cents and seven cents are how many cents?

4. A box of berries for 9 cents and a bunch of onions for 5 cents will cost how many cents?

5. Eighteen boys and eight girls in a class are how many pupils?

6. Henry sold 17 papers Saturday and 9 Monday. How many papers did he sell in these two days?

7. Clara wished to buy a pencil for 5 cents, a tablet for 10 cents and a ruler for 5 cents. How many cents did she need?

8. Wilbur picked 7 boxes of apples and 6 boxes of pears. How many boxes of fruit did he pick?

9. Willis and his father went fishing. Willis caught 5 trout and his father caught 7. How many did both catch?

10. Blanche ironed 8 handkerchiefs and 7 towels for her mother. How many of both did she iron?

11. Mark bought a lunch for eighteen cents and had seven cents left. How many cents had he at first?

18		9
9	"18 and 9 are 27" "9 and 18 are 27"	18
27		27

Read and give the sum:

1. 28 and 8	**2.** 36 and 9	**3.** 84 and 4	**4.** 36 and 7
5. 45 and 3	**6.** 67 and 8	**7.** 85 and 4	**8.** 29 and 5
9. 39 and 9	**10.** 47 and 3	**11.** 67 and 4	**12.** 74 and 3
13. 58 and 6	**14.** 38 and 5	**15.** 49 and 8	**16.** 53 and 3
17. 66 and 6	**18.** 43 and 2	**19.** 78 and 4	**20.** 26 and 3

Add: "Say 27 and 8 are ——"

21.	8	7	8	9	8	**22.**	6	7	8	7	6
	27	98	47	76	17		39	68	87	58	19
23.	6	4	5	7	9	**24.**	8	4	6	9	5
	27	69	88	16	34		45	79	57	94	18
25.	4	2	8	6	4	**26.**	3	9	7	9	5
	34	59	13	65	87		48	72	84	12	26
27.	5	6	4	8	9	**28.**	3	9	5	7	8
	25	48	76	38	18		67	59	19	87	92
29.	6	7	9	6	8	**30.**	9	3	8	8	9
	78	27	45	64	36		29	59	78	32	48
31.	5	6	8	8	9	**32.**	7	7	9	8	5
	79	24	19	38	19		27	33	47	68	29

5	
2	
3	Say, "14 (8 + 6), 17, 19, 24."
8	Test by adding *down*.
6	Say, "7 (5 + 2), 10, 18, 24."
24 *Sum*	The sum is 24.

In silent addition the pupil should "think" what he is here told to "say."

Add and test: make problems.

1.	3	**2.**	3	**3.**	3	**4.**	3	**5.**	3	**6.**	9	**7.**	3	**8.**	5
	7		9		2		3		8		9		2		2
	8		3		8		3		6		9		9		8
9.	4	**10.**	4	**11.**	3	**12.**	4	**13.**	3	**14.**	3	**15.**	2	**16.**	6
	7		8		4		7		7		9		9		4
	4		2		8		4		5		6		4		4
17.	5	**18.**	3	**19.**	5	**20.**	2	**21.**	5	**22.**	6	**23.**	5	**24.**	4
	7		4		3		6		9		5		9		9
	3		2		8		9		5		5		5		5
	7		5		9		4		4		5		4		5
	4		8		7		3		6		5		4		4
25.	6	**26.**	7	**27.**	2	**28.**	3	**29.**	5	**30.**	6	**31.**	8	**32.**	4
	3		8		9		8		7		8		5		3
	4		2		4		5		6		2		4		5
	5		5		8		2		8		7		9		6
	2		6		3		4		6		5		7		8

NOTE. — Drill in four-figure addition in columns is not profitable.

Add:

1.	3	13	23	43	53	8	8	8	8
	8	8	8	8	8	73	63	83	33
2.	4	14	24	34	44	8	8	8	8
	8	8	8	8	8	64	84	54	74
3.	8	8	8	8	8	75	85	65	55
	5	15	25	35	45	8	8	8	8
4.	6	16	26	46	36	8	8	8	8
	8	8	8	8	8	76	56	66	86
5.	7	17	27	37	47	8	8	8	8
	8	8	8	8	8	87	57	77	67
6.	8	18	28	38	48	8	8	8	8
	8	8	8	8	8	68	88	78	58
7.	9	19	29	39	49	8	8	8	8
	8	8	8	8	8	79	59	89	69
8.	55	79	45	88	67	8	7	8	7
	8	6	7	5	8	49	87	73	34
9.	65	89	63	74	38	8	4	7	5
	4	3	7	6	5	17	19	58	68

10.	8	11. 6	12. 8	13. 8	14. 2	15. 4	16. 8	17. 3	18. 8
	2	8	8	4	8	5	3	8	5
	8	8	3	2	4	5	7	9	8
	8	9	7	8	6	3	5	4	4
	7	7	9	9	8	6	4	4	9

Add:

1.	1	11	21	41	2	12	22	32	2
	9	9	9	9	9	9	9	9	9
2.	3	13	23	33	43	73	83	53	63
	9	9	9	9	9	9	9	9	9
3.	4	14	24	34	44	9	9	9	9
	9	9	9	9	9	74	64	84	54
4.	5	15	25	35	45	9	9	9	9
	9	9	9	9	9	64	84	74	54
5.	6	16	26	36	76	86	46	66	56
	9	9	9	9	9	9	9	9	9
6.	9	9	9	9	9	9	9	9	9
	7	17	27	37	47	87	57	77	67
7.	9	9	9	9	9	9	9	9	9
	8	18	28	38	48	78	58	88	68
8.	9	9	9	9	9	9	9	9	9
	9	19	29	39	49	59	89	69	79
9.	18	37	48	76	89	38	45	94	87
	9	6	9	5	7	8	7	5	6

10.	9	11. 9	12. 8	13. 5	14. 4	15. 2	16. 9	17. 8	18. 7
	7	3	9	6	9	9	6	9	6
	3	2	7	3	8	7	9	7	9
	2	5	2	7	7	9	4	5	8
	6	9	1	9	6	3	7	8	4

Add:

1. 12	15	38	24	**2.** 15	23	37	29
3	9	7	6	8	7	6	9
3. 16	22	41	38	**4.** 26	17	30	26
6	7	9	8	8	7	8	9

5. 6	**6.** 7	**7.** 9	**8.** 8	**9.** 7	**10.** 6	**11.** 9	**12.** 8
9	8	3	6	6	7	7	6
3	6	4	9	9	8	6	7
4	5	8	3	3	4	8	8
8	4	6	8	4	5	8	9

13. 9	**14.** 8	**15.** 8	**16.** 7	**17.** 6	**18.** 6	**19.** 7	**20.** 8
7	7	6	6	7	9	6	3
6	5	9	2	7	3	6	8
7	9	6	9	5	5	3	6
9	9	9	5	5	7	7	9

21. 7	4	6	7	**22.** 3	7	8	7
26	14	20	34	32	14	19	33
23. 7	9	5	9	**24.** 6	6	9	6
37	23	27	32	33	20	11	13

25. 6	**26.** 7	**27.** 8	**28.** 7	**29.** 3	**30.** 8	**31.** 7	**32.** 7
7	9	9	8	5	7	9	6
9	8	3	6	8	6	8	9
8	7	4	9	6	9	6	3
4	6	8	8	9	3	5	8
5	7	6	3	4	8	4	7

4	
5	In adding start
9	with 18. Say
4	"22, 31, 36, 40."
18	Write 40.
40	"The sum is 40."

Add: Begin with the bottom number.

1.	4	**2.**	5	**3.**	4	**4.**	5	**5.**	6
	5		6		9		8		9
	9		7		8		9		8
	4		8		7		6		7
	18		16		13		19		14
6.	8	**7.**	4	**8.**	9	**9.**	7	**10.**	8
	5		8		7		6		6
	8		9		6		9		5
	4		6		8		3		9
	24		28		26		29		23
11.	7	**12.**	9	**13.**	8	**14.**	6	**15.**	9
	8		8		4		5		8
	9		7		5		9		7
	6		6		6		8		6
	35		39		37		34		32

16. Two teams are playing baseball. There are nine boys in each team. How many boys are there in both teams?

17. The Grant school baseball team scored seven times in the first game and six times in the second. How many times did it score in the two games?

0	10	20	30	40	50	60	70	80	90
1	11	21	31	41	51	61	71	81	91
2	12	22	32	42	52	62	72	82	92
3	13	23	33	43	53	63	73	83	93
4	14	24	34	44	54	64	74	84	94
5	15	25	35	45	55	65	75	85	95
6	16	26	36	46	56	66	76	86	96
7	17	27	37	47	57	67	77	87	97
8	18	28	38	48	58	68	78	88	98
9	19	29	39	49	59	69	79	89	99

1. Make a table like the above.

2. Count by 10's from 0 to 100; from 100 to 0.

3. Count by 10's from 1 to 101; from 2 to 102.

4. Count by 10's from 3, from 4, from 5.

5. Count by 10's from 21 to 91, from 32 to 92, from 64 to 164, from 26 to 126.

6. Add 5 to each number in the first line.

7. Add 6 to each number in the line beginning with 3. Add 7. Add 8.

8. Add 8 to each number in the line beginning with 6. Add 4. Add 5.

9. Add 9 to each number in the line beginning with 4. Add 2. Add 7. Add 3.

NOTE. — Continue similar exercises frequently.

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*
1.	2	9	5	6	3	7	0	1	8	4
2.	18	12	19	11	14	17	13	16	15	10
3.	24	27	23	26	22	20	25	21	28	29
4.	32	35	33	30	38	34	31	36	39	37
5.	46	44	47	41	48	40	45	42	49	43
6.	58	52	57	59	51	56	53	50	55	54
7.	66	61	65	60	64	69	63	68	62	67
8.	72	76	79	71	75	78	70	74	77	73
9.	84	87	80	83	89	86	82	88	85	81
10.	94	99	93	95	98	92	96	97	90	91

1. Add 1 to each number in the first row. Add 2.

2. Add 3, 4, 5, 6, 7, 8, 9 to each number in the first row.

3. Add 1, 2, 3, 4, 5, 6, 7, 8, 9 to each number in the second row. Continue with the remaining rows.

4. Add 1 to each number in column *a*; column *b*.

5. Add 2, 3, 4, 5, 6, 7, 8, 9, to each number in columns *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, *i* and *j*.

6. Adding 8 to each number, see how quickly you can go through the table by lines; by columns.

7. Adding 5 to each number, see how quickly you can go through the table by columns; by lines.

Return frequently to this exercise.

One hundred is written	**100**
Two hundred is written	**200**
Five hundred is written	**500**

1. *Write in figures:*

Four hundred, six hundred,
seven hundred, eight hundred,
nine hundred, three hundred.

2. *Read:*

300	700	200	500
600	400	800	900

324 is read *three hundred twenty-four.*
642 is read *six hundred forty-two.*

NOTE. — Do not use the word *and* in reading whole numbers.

3. *Read:*

216	759	279	946	416	372
185	483	585	361	312	296
462	211	364	637	828	718

4. *Write in figures:*

Four hundred twenty-one.
Three hundred forty-nine.
Six hundred fifty-two.
One hundred forty-one.
Two hundred ninety-three.
Seven hundred sixteen.
Nine hundred seventy-seven.

To the teacher. — Dictate many numbers for pupils to write.

Three hundred five is written	**305**
Four hundred six is written	**406**
Nine hundred one is written	**901**

1. *Read :*

307	409	601	502	704
204	108	902	503	806
308	703	205	607	908
149	785	109	983	415

2. *Write :*

Seven hundred six.	Nine hundred three.
Eight hundred five.	Six hundred eight.
Two hundred three.	Four hundred two.
One hundred seven.	Nine hundred forty-four.
Three hundred nine.	Eight hundred seventy-nine.

The figure *at the right* is called **units'** figure; the *second,* **tens'** figure; the *third,* **hundreds'** figure.

634 is 6 *hundreds,* 3 *tens,* and 4 *units.*

The cipher, or *zero,* is used to show that there are no units, or that there are no tens.

3. *Tell the number of hundreds, tens, and units :*

246	285	650	320	300
321	807	718	510	402

4. *Write the number which contains :*

Five tens and seven units.

Three hundreds, two tens, and eight units.

3,000 is read 3 *thousand*
3,200 is read 3 *thousand* 200
3,265 is read 3 *thousand* 265

NOTE. — Do not use the word *and* in reading whole numbers.

Read:

1.	2,000	2,300	2,350	2,359
2.	5,000	5,100	5,160	5,164
3.	7,000	7,700	7,740	7,745
4.	3,000	3,500	3,530	3,531
5.	1,000	1,200	1,280	1,288
6.	9,000	9,600	9,610	9,617
7.	4,000	4,800	4,820	4,826
8.	8,000	8,400	8,470	8,472
9.	6,000	6,900	6,990	6,993

Write in figures:

10. Two thousand, eight hundred forty.
11. Five thousand, seven hundred thirty.
12. Seven thousand, three hundred seventy-five.
13. Nine thousand, two hundred twenty.
14. Four thousand, five hundred seventy.
15. Eight thousand, two hundred.
16. One thousand, five hundred ninety-six.

Read:

17.	2,000	2,400	2,406	2,006
18.	4,000	4,100	4,101	4,001
19.	9,000	9,200	9,207	9,007
20.	10,000	10,100	10,109	10,009

44	
24	Say "9(2 + 7), 15, 19, 23."
56	Write 3. Add 2 to next column.
27	Say "5, 7, 12, 14, 18."
32	Write 18.
183	"The sum is 183."

1.	2.	3.	4.	5.	6.
54	24	89	67	98	39
36	78	64	93	36	46
78	65	39	48	70	58
25	38	78	56	29	75
36	24	50	37	48	29

7.	8.	9.	10.	11.	12.
17	36	93	20	63	73
35	8	78	2	89	96
6	46	30	3	65	40
27	7	69	47	78	38
49	38	76	80	59	65

13.	14.	15.	16.	17.	18.
63	28	4	36	72	67
9	19	67	29	36	38
48	8	25	70	47	79
76	67	18	65	53	45
35	23	36	44	76	67

19.	20.	21.	22.	23.	24.
29	34	72	61	52	36
18	21	32	45	27	19
7	25	41	10	9	33
42	77	19	37	12	8
63	19	25	29	78	65

Addends are the numbers added.
The **sum** is the result of addition.

935	Say "10(4 + 6), 15."
426	Write 5. Add 1 to the next column.
334	Say "4(1 + 3), 6, 9." Write 9.
1695 *Sum*	Say "7(3 + 4), 16." Write 16. "The sum is 1695."

Add up. Read addends and sums.

1. 434	**2.** 124	**3.** 248	**4.** 782	**5.** 25	**6.** 478
235	689	434	69	634	207
327	376	568	148	78	640
7. 684	**8.** 248	**9.** 607	**10.** 248	**11.** 606	**12.** 360
206	167	189	64	248	104
714	204	465	172	120	268
13. 93	**14.** 79	**15.** 38	**16.** 29	**17.** 76	**18.** 69
65	46	87	83	84	24
24	34	34	85	39	87
42	89	26	38	26	64
45	24	39	79	78	26
19. 251	**20.** 83	**21.** 481	**22.** 376	**23.** 424	
683	99	389	598	68	
94	605	56	720	375	
72	728	384	897	124	
605	690	471	350	606	

1. Bertha's reader cost 35 cents and her note book cost 8 cents. What did both cost?

2. Dick bought a pound of butter for 48 cents and a box of berries for 8 cents. What did he pay for both?

3. Ethel paid 35 cents for a pair of shears and 9 cents for buttons. How much money did Ethel spend?

4. A farmer went to market with chickens. He sold 15 and had 7 left. How many did he take to market?

5. Henry is 9 years old and his father is 29 years older. How old is his father?

6. There were 19 children in our class, and 8 more entered. How many were there then?

7. A tree on our lawn is 46 years old. How old will it be 7 years from now?

8. One apple tree in Mr. French's orchard bore 17 boxes of apples and another bore 16 boxes. How many boxes of apples did both trees bear?

9. In Mr. Farmer's orchard there are 57 apple trees and 6 pear trees. How many trees are there in the orchard?

10. Edward caught 15 fish and his brother caught 27. How many did both catch?

11. Forty-eight boys and seven girls are how many children?

1. Charles collected 24 stamps one week, 37 the second week, and 48 the third week. How many stamps did he collect in the three weeks?

2. A tablet costs 10¢, a pencil 3¢, and a box of paints 15¢. How many cents will the clerk charge?

3. Two brothers went to a circus. They spent 50¢ for tickets to the main show, 10¢ for peanuts, and had 20¢ left. How much money did they have at first?

4. John was getting subscriptions to a magazine. He obtained 14 the first week, 19 the second week, and 38 during the rest of the month. How many did he get in the month?

5. On an automobile trip that lasted three days we went 75 miles the first day, 87 miles the second day, and 94 miles the third day. How many miles did we travel in these three days?

6. Harold collected 24¢ from one customer, 37¢ from another, and 48¢ from another. How much money did he collect from the three customers?

7. Find the sum of eighteen, twenty-four, and seventy-five.

8. Franklin went to the store for his mother. He bought some sugar for 30¢, a cabbage for 8¢, and a bottle of milk for 13¢. What did the three articles cost?

9. Fred earned 25¢, Foster 35¢, and Dick 50¢. They gave this money to the baseball fund. How much did they give together?

10. There are 22 seats in the first grade room, and 8 seats in the second grade room. How many seats are there in the two rooms?

Finding an Addend

1. 4 and how many are 10?
2. 7 and how many are 12?
3. 5 and how many are 9?
4. 3 and how many are 9?
5. 4 and how many are 8?

Read, supplying the missing addend:

6. $5 + ? = 7$
7. $6 + ? = 9$
8. $4 + ? = 5$
9. $9 + ? = 14$
10. $8 + ? = 10$
11. $5 + ? = 10$
12. $6 + ? = 14$
13. $8 + ? = 16$
14. $4 + ? = 12$
15. $8 + ? = 14$
16. $4 + ? = 7$
17. $9 + ? = 15$
18. $3 + ? = 11$
19. $9 + ? = 17$
20. $9 + ? = 18$

21. What number added to 4 makes 12?
22. What number added to 8 makes 15?
23. 8 and what number are 17?
24. 4 and what number are 13?
25. 5 and what number are 12?
26. 7 and what number are 14?
27. 8 and what are 16?
28. 7 and what are 9?
29. 4 and what are 7?
30. 5 and what are 10?
31. 6 and what are 12?
32. 9 and what are 18?
33. 7 and what are 13?
34. 9 and what are 12?
35. What number added to 9 makes 12?
36. What number added to 7 makes 11?
37. What number added to 5 makes 13?
38. What number added to 8 makes 15?

6 ? 11	$6 + ? = 11.$ Say "6 and what are 11? 6 and 5 are 11."

Find the missing addend:

1. 6 ? 10	**2.** 9 ? 18	**3.** 8 ? 10	**4.** 4 ? 13	**5.** 10 ? 16
6. 6 ? 12	**7.** 9 ? 16	**8.** 8 ? 14	**9.** 5 ? 12	**10.** 8 ? 17

11 6 5	$11 - 6 = 5.$ Say "6 and what are 11? 6 and 5 are 11."

Subtract; that is, "Find the missing addend":

11. 11 3	**12.** 14 3	**13.** 12 5	**14.** 10 9	**15.** 14 9
16. 16 7	**17.** 13 8	**18.** 15 9	**19.** 12 8	**20.** 13 9
21. 9 7	**22.** 12 10	**23.** 6 2	**24.** 18 10	**25.** 7 3
26. 14 10	**27.** 12 7	**28.** 17 10	**29.** 16 8	**30.** 19 10

NOTE. — For methods in subtraction see appendix.

Read, giving the missing number:

1.	$5 + ? = 7$	5.	$? + 4 = 9$	9.	$? + 9 = 17$
2.	$2 + ? = 11$	6.	$? + 5 = 12$	10.	$9 + ? = 16$
3.	$3 + ? = 12$	7.	$? + 8 = 13$	11.	$? + 7 = 11$
4.	$9 + ? = 17$	8.	$? + 3 = 10$	12.	$? + 6 = 12$

$$7 - 5 = 2$$

$$\begin{array}{r} 7 \\ 5 \\ \hline 2 \end{array}$$

7 *minus* **5** *are* **2**

This is an example in **subtraction.**

7 is the **minuend.**

5 is the **subtrahend.**

2 is the **difference.**

$7 - 5 = ?$ is solved the same as $5 + ? = 7$

Read and give the differences:

13.	$7 - 5 = ?$	18.	$8 - 2 = ?$	23.	$15 - 7 = ?$
14.	$4 - 3 = ?$	19.	$11 - 3 = ?$	24.	$17 - 7 = ?$
15.	$12 - 4 = ?$	20.	$15 - 5 = ?$	25.	$18 - 9 = ?$
16.	$9 - 6 = ?$	21.	$9 - 2 = ?$	26.	$14 - 8 = ?$
17.	$10 - 5 = ?$	22.	$13 - 6 = ?$	27.	$6 - 3 = ?$

28. Ernest has 12 marbles, Will has 5 less. How many has Will?

29. Ted is 12 years old. His sister Mary is 4 years younger. How old is Mary?

30. Make original problems using the numbers in examples 13 to 22.

Find the differences:

1. 10 − 2	3. 11 − 8	5. 17 − 8	7. 14 − 5	9. 16 − 8	11. 9 − 6
2. 12 − 4	4. 15 − 7	6. 13 − 9	8. 16 − 7	10. 18 − 9	12. 11 − 5

$3 + ? = 17$ is solved the same as $17 - 3 = ?$

1. $3 + ? = 19$	6. $4 + ? = 26$	11. $6 + ? = 36$
2. $3 + ? = 16$	7. $2 + ? = 29$	12. $5 + ? = 25$
3. $3 + ? = 15$	8. $7 + ? = 28$	13. $8 + ? = 48$
4. $3 + ? = 18$	9. $3 + ? = 25$	14. $4 + ? = 24$
5. $3 + ? = 14$	10. $6 + ? = 27$	15. $7 + ? = 27$

Subtract:

16. 26 − 3	17. 29 − 6	18. 27 − 4	19. 28 − 9	20. 21 − 7	21. 24 − 6
22. 23 − 7	23. 20 − 9	24. 22 − 9	25. 34 − 6	26. 47 − 8	27. 56 − 9
28. 63 − 4	29. 76 − 8	30. 81 − 7	31. 95 − 6	32. 38 − 9	33. 56 − 7
34. 47 − 8	35. 96 − 8	36. 27 − 9	37. 84 − 7	38. 65 − 8	39. 73 − 8

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*
1.	12	10	19	17	15	13	16	14	18	11
2.	29	24	28	27	21	23	22	20	25	26
3.	37	39	36	31	34	38	30	33	32	35
4.	43	49	42	45	40	48	41	47	44	46
5.	54	55	50	53	56	51	59	57	52	58
6.	61	66	65	60	69	64	63	68	67	62
7.	76	72	79	74	73	75	78	76	78	70
8.	80	83	84	89	87	86	85	81	82	88
9.	95	91	97	92	98	90	94	99	93	96

1. Subtract 2 from each number in line 1.

2. Subtract 3 from each number in line 2. Continue with 4, 5, 6, 7, 8, 9.

3. Subtract 2 from each number in column *a*.

4. Subtract 3 from each number in column *b*. Continue with 4, 5, 6, 7, 8, 9.

5. Subtract 4 from each number in column *c*.

6. Subtract 5 from each number in column *d*.

7. Subtract 6 from each number in column *e*.

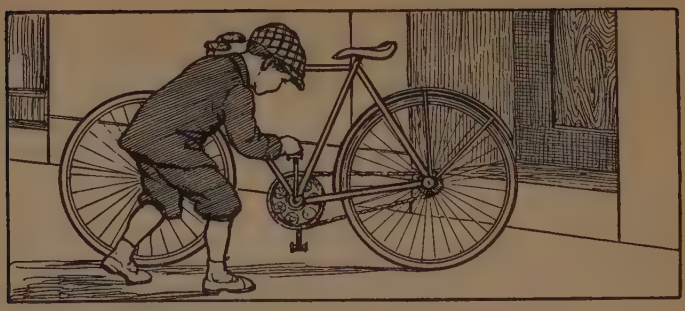
8. Subtract 8 from each number in line 8.

9. Subtract 9 from each number in line 9.

10. Subtract 10 from each number in the first line.

11. Subtract 10 from each number in lines 4, 5, 6, 7, 8, and 9.

Return often to this table for drill.



1. William has saved $18 toward a bicycle which cost $24. How many dollars does he lack?

The *number* of dollars is the difference between 18 and 24 which is 6.

2. May is 12 years old and Jane is 7. Mary is how many years older than Jane?

3. It is 14 miles from John's home to his grandfather's. He rides 9 miles on the train and walks the remainder. How many miles does he walk?

4. Henry has 22 marbles and James has 17. How many more has Henry than James?

5. Helen has 15 chickens and 9 ducks. She has how many more chickens than ducks?

6. A freight train of 21 cars took other cars from a sidetrack until it was 30 cars long. How many cars were added?

7. Hazel owed 25 cents and paid 10 cents. How many more cents must she pay?

8. Forty cents is how much more than twenty-eight cents?

66 *Minuend* 32 *Subtrahend* 34 *Difference*	Say "2 and what are 6? 2 and **4** (write 4) are 6. 3 and what are 6? 3 and **3** (write 3) are 6. The difference is 34."

Subtract:

1. 66 24	**2.** 66 13	**3.** 66 52	**4.** 66 45	**5.** 66 31	**6.** 66 42
7. 866 234	**8.** 466 132	**9.** 866 325	**10.** 766 264	**11.** 566 132
12. 646 134	**13.** 686 206	**14.** 696 346	**15.** 656 225	**16.** 676 372

17. 4666 − 1234 = ?
18. 6688 − 2324 = ?
19. 8666 − 3245 = ?
20. 4866 − 2465 = ?
21. 6486 − 2432 = ?
22. 6848 − 2732 = ?
23. 6464 − 5234 = ?
24. 8468 − 6134 = ?
25. 8646 − 2132 = ?
26. 9674 − 1273 = ?
27. 8643 − 2141 = ?
28. 9764 − 2132 = ?
29. 8765 − 4123 = ?
30. 9876 − 1325 = ?

31. The gasoline tank on Mr. Smith's car holds 20 gallons. There are 12 gallons in it now. How many gallons are needed to fill it?

32. A farmer has 15 cows and 6 horses. He has how many more cows than horses?

33. In our class there are 18 boys and 13 girls. There are how many more boys than girls?

48 *Minuend*
23 *Subtrahend*
25 *Difference*

Always begin subtracting with the units' column.

Test 25 + 23 = 48
Difference + Subtrahend = Minuend.

Subtract and test :

In testing, do not rewrite the numbers.

1. 65	**2.** 38	**3.** 33	**4.** 59	**5.** 97	**6.** 78
32	26	21	34	63	74
7. 66	**8.** 87	**9.** 57	**10.** 69	**11.** 28	**12.** 83
46	24	34	25	18	52
13. 384	**14.** 645	**15.** 493	**16.** 677	**17.** 821	
124	232	452	434	420	
18. 6375	**19.** 3252	**20.** 3867	**21.** 5682		
4261	1150	3043	3251		
22. 8974	**23.** 8768	**24.** 7897	**25.** 7687		
7434	1240	2094	5623		

26. The minuend is 3896, the subtrahend 1762. What is the remainder?

27. How many years were there from 1816 to 1928?

28. The minuend is 9468, the subtrahend 2324. Find the difference.

29. The minuend is 8467, the subtrahend 6324. What is the remainder?

30. Subtract 2464 from 8978. Prove that the remainder is correct.

62 46 16	62 − 46 = 16. Say "6 and 6 (write 6) are 12." Add 1 to 4, calling it 5. Say "5 and 1 (write 1) are 6." Test: 16 + 46 = 62.

Subtract and test:

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*
1.	82	42	92	62	32	52	72	92
	48	26	75	49	13	27	14	65
2.	64	94	54	84	44	74	34	54
	18	47	36	59	26	45	18	29
3.	80	40	90	70	50	60	90	30
	42	28	46	35	17	34	43	19
4.	80	74	47	38	23	21	26	48
	56	40	38	27	16	14	17	19
5.	32	41	26	67	22	21	61	25
	25	19	17	52	17	13	15	15
6.	45	36	21	42	27	35	44	32
	36	19	16	39	12	29	18	17
7.	41	34	24	36	56	75	96	84
	29	22	15	23	19	21	47	39
8.	45	40	46	28	75	31	93	79
	19	12	22	17	22	19	34	60

Subtract 756 from 1324.

```
1324
 756
 568
```

Say "6 and **8** (write 8) are 14."
Add 1 to 5 calling it 6.
Say "6 and **6** (write 6) are 12."
Add 1 to 7 calling it 8.
Say "8 and **5** (write 5) are 13."
Test: 756 + 568 = 1324.

Subtract:

1. 1246 − 789	**2.** 1453 − 876	**3.** 1264 − 479	**4.** 1323 − 678
5. 1846 − 278	**6.** 1743 − 698	**7.** 1256 − 469	**8.** 1064 − 896

Subtract 2456 from 9842.

$$9842 - 2456 = \begin{array}{r} 9842 \\ 2456 \\ \hline 7386 \end{array}$$

9. 6846 − 3278	**10.** 2345 − 1269	**11.** 5462 − 1279	**12.** 6843 − 2178
13. 9624 − 1286	**14.** 8423 − 2186	**15.** 9624 − 1378	**16.** 7652 − 1367
17. 7840 − 1278	**18.** 8400 − 4267	**19.** 9302 − 2186	**20.** 6440 − 3176
21. 8000 − 1728	**22.** 7465 − 3942	**23.** 2136 − 1619	**24.** 6439 − 2746

The **minuend** *is the number from which we subtract.*
The **subtrahend** *is the number subtracted.*
The **difference** *or* **remainder** *is the result of subtraction.*

Subtract and test :

1.	63 − 25	**8.**	60 − 18	**15.**	70 − 16				
2.	75 − 37	**9.**	84 − 57	**16.**	62 − 35				
3.	42 − 19	**10.**	74 − 47	**17.**	85 − 46				
4.	55 − 36	**11.**	50 − 17	**18.**	93 − 38				
5.	44 − 39	**12.**	82 − 48	**19.**	92 − 78				
6.	56 − 26	**13.**	33 − 28	**20.**	80 − 59				
7.	45 − 29	**14.**	64 − 26	**21.**	73 − 15				

22.	830	**24.**	333	**26.**	129	**28.**	422	**30.**	604
	196		209		89		100		428
23.	745	**25.**	462	**27.**	930	**29.**	623	**31.**	200
	375		179		770		448		102

32.	1084	**33.**	8204	**34.**	3176	**35.**	23576
	271		7032		2714		14809

Read the minuends in the last five examples.
Read the subtrahends.

36. Find the difference when the subtrahend is 1679 and the minuend 2361.

37. 840 − 325 = ?

38. Find the difference between 1688 and 1776.

Subtract and test :

1. 341 69	5. 643 55	9. 732 46	13. 851 64	17. 650 89
2. 124 99	6. 100 99	10. 101 99	14. 102 99	18. 110 99
3. 467 328	7. 538 104	11. 256 167	15. 566 222	19. 484 275
4. 561 355	8. 432 132	12. 435 362	16. 538 421	20. 308 199

21. 5789 3507	24. 6397 2516	27. 8671 4239	30. 8605 3208
22. 4308 2159	25. 6597 3415	28. 5846 2684	31. 7951 3666
23. 62521 38475	26. 28663 17591	29. 46235 26523	32. 86272 59070

33. Mr. Brown bought a horse for $245 and sold it for $190. How much did he lose?

34. Six hundred seven pupils are enrolled in our school. Five hundred ninety-three are present. How many are absent?

35. Of 956 boy scouts in a parade, 784 were in uniform. How many were not in uniform?

1. $8 + 7 = ?$
2. $7 + 9 = ?$
3. $6 + ? = 14$
4. $? + 6 = 11$
5. $17 - 9 = ?$
6. $15 - 7 = ?$
7. $14 - ? = 8$
8. $? - 5 = 12$

Add:

9.	10.	11.	12.	13.
3	27	306	3672	19768
5	36	574	4031	10312
4	50	297	5169	54206
6	27	345	7342	31574
2	45	216	5508	87536

Subtract and test:

14.	16.	18.	20.
82	303	9413	74621
48	294	1506	58054
15.	**17.**	**19.**	**21.**
83	321	6413	64012
46	32	1509	25053

Add:

22. $7+7+3+8= ?$
$6+8+6+2= ?$
$5+3+9+5= ?$
$8+9+7+7= ?$
$+ + + = ?$

23. $6+5+7+2+6= ?$
$5+7+6+9+9= ?$
$4+6+8+7+4= ?$
$8+8+5+8+3= ?$
$+ + + + = ?$

24. The minuend is 98 and the subtrahend 48. Find the remainder.

25. What is the difference between 837 and 206?

26. How much larger is 984 than 863?

27. What number added to 48 makes 89?

1. Which is the hour hand? The minute hand?

2. To what number is the hour hand pointing?

3. To what number is the minute hand pointing?

4. What time is it by this clock?

5. What time is it when the hour hand points to IV and the minute hand to XII?

6. What time is it when the minute hand points to VI and the hour hand is between IV and V?

7. How many minute spaces are there between XII and I? Between XII and II?

8. How many minutes are there in a whole hour?

9. Count the minute spaces by 5's beginning at I.

10. To what numbers do the hands point at 15 minutes past four? At 15 minutes before nine?

11. Draw a dial to show how the hands would point at half past ten.

12. Draw a dial to show how the hands would point at 15 minutes past one. At 15 minutes before one.

On page 40 is a picture of a clock face. The numbers are expressed by letters, and are called Roman numerals. These Roman numerals are also used to number chapters in books. They are also used on public buildings to show the date of construction.

I = 1 V = 5 X = 10

1 = I	6 = 5 + 1 = VI
2 = 1 + 1 = II	7 = 5 + 2 = VII
3 = 1 + 1 + 1 = III	8 = 5 + 3 = VIII
4 = 5 − 1 = IV	9 = 10 − 1 = IX
5 = V	10 = X

(On clock dials 4 is sometimes written IIII.)

Read these numbers:

X; II; VIII; IV; III; VII; IX; V.

The numbers from 11 to 20 are written by prefixing X to the numbers from 1 to 10.

11 = 10 + 1 = XI	16 = 10 + 6 = XVI
12 = 10 + 2 = XII	17 = 10 + 7 = XVII
13 = 10 + 3 = XIII	18 = 10 + 8 = XVIII
14 = 10 + 4 = XIV	19 = 10 + 9 = XIX
15 = 10 + 5 = XV	20 = 10 + 10 = XX

The teacher read a book to the class. The children said they liked chapters III, IV, VII, and IX. Chapters I, V, XIV, and XIX were difficult. Chapter XII was the longest and chapter XVI was the shortest. Chapter XX was the last.

Warren's father sent him to the post office to buy ten stamps. He bought these stamps:

How many stamps were there in each strip? How many strips were there? How many stamps did he get?

The next day he bought these stamps:

How many stamps did he buy? There are how many rows of stamps? How many stamps are there in each row?

The third day he bought these stamps: How many stamps did he get? How many rows of stamps are there? How many stamps are there in each row?

Two 5's are 10
Five 2's are 10

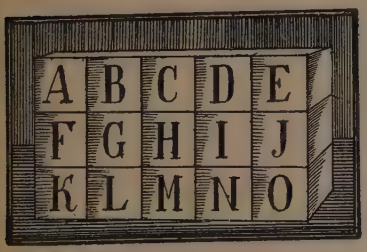
Mr. Jones brings us fresh eggs in a case like this picture. How many rows of eggs are there? How many eggs are there in each row? How many eggs are there in the case?

Two 6's are how many?
Six 2's are how many?

The window in our schoolroom looks like this picture. There are how many rows of glass? How many panes are there in a row? How many panes are there in the window?

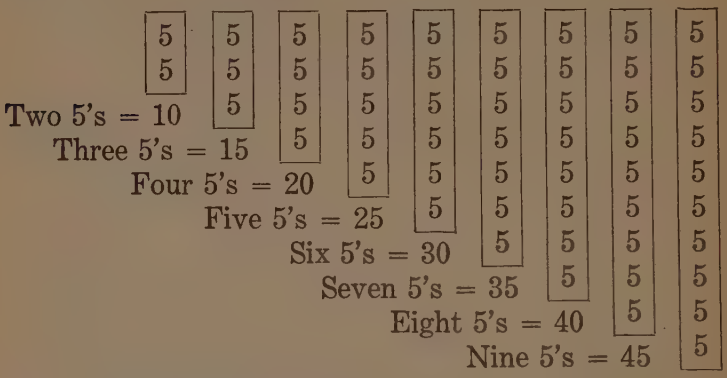
Two 4's are how many?
Four 2's are how many?

Bobby Jones is building a wall with his blocks. His wall is five blocks long and three blocks high. How many blocks does he need for this wall?



Five 3's are how many?
Three 5's are how many?

1. Find the cost of two ice cream cones at 5 cents each. To find the cost you must know the sum of two 5's or two times five.



2. Two 5's are how many?
3. Three 5's are how many?
4. Four 5's are how many?
5. Five 5's are how many?
6. Six 5's are how many?
7. Seven 5's are how many?

"Eight 5's are 40" may be written "$8 \times 5 = 40$." It is read "8 times 5 are 40."

8. Read and give the answers:

$1 \times 5 =$ $10 \times 5 =$ $5 \times 0 =$

9. One ice cream cone costs 5 cents. Find the cost of 5 ice cream cones.

10. Tell the number of cones that can be bought with any one of these sums:

15¢ 25¢ 35¢ 50¢ 10¢ 45¢ 40¢ 5¢ 20¢ 30¢

5	3	**3 × 5 = 15**
3	5	**3** *times* **5** *are* **15**
15	15	This is an example in **multiplication.**
		3 and 5 are the **factors,** 15 is the **product**

1. What do 5 postage stamps cost at 3¢ each?

The *number of cents* is the product of 5 and 3, which is 15. They cost 15 cents.

2. How many cents are there in three 5-cent pieces?

3. How many dollars are there in four 5-dollar bills?

4. Two pairs of shoes at $5 each will cost how much?

5. Make a drawing to illustrate 3 × 5.

6. How many postage stamps are there in a sheet 6 stamps long and 5 stamps wide?

7. What is the product when the factors are 6 and 5? 5 and 7? 2 and 6?

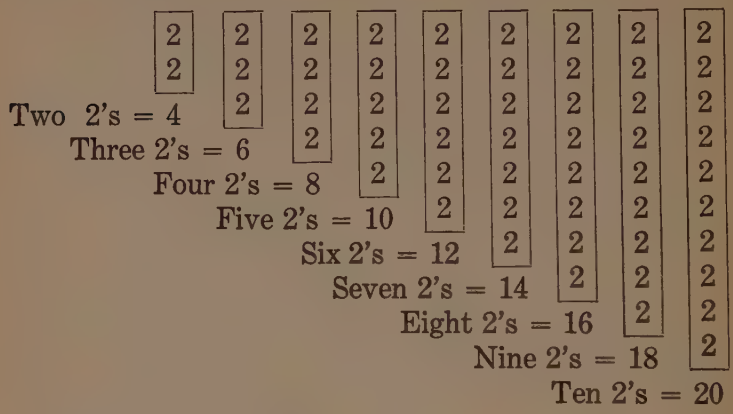
8. There are 4 quarts in a gallon. How many quarts are there in 5 gallons of cream?

9. Ruth bought a card of buttons. It had 2 rows of buttons with 6 buttons in a row. How many buttons did she buy?

10. In John's garden there are 5 rows of potatoes with 9 hills in a row. How many hills are there?

11. Make a problem using 5 × 5.

1. Make a table of 2's adding 2's to find the sum of each column:



2. Give the answers:

$3 \times 2 =$	$7 \times 2 =$	$2 \times 2 =$
$5 \times 2 =$	$1 \times 2 =$	$4 \times 2 =$
$6 \times 2 =$	$9 \times 2 =$	$8 \times 2 =$

3. How many 2's are there in 8? In 12? In 16? In 10? In 14? In 4? In 18? In 2? In 6?

4. At 2 cents each how many pencils can you buy for 4 cents?

5. At 2 cents each how many stamps can you buy for 16 cents?

6. Six 2-cent stamps cost how many cents?

7. What is the cost of 9 papers at 2 cents a paper?

8. How many papers must Frank sell at 2 cents each to collect 10 cents?

Complete and learn the following multiplication facts:

$1 \times 5 = ?$	$1 \times 2 = ?$	$1 \times 10 = ?$	$1 \times 4 = ?$
$2 \times 5 = ?$	$2 \times 2 = ?$	$2 \times 10 = ?$	$2 \times 4 = ?$
$3 \times 5 = ?$	$3 \times 2 = ?$	$3 \times 10 = ?$	$3 \times 4 = ?$
$4 \times 5 = ?$	$4 \times 2 = ?$	$4 \times 10 = ?$	$4 \times 4 = ?$
$5 \times 5 = ?$	$5 \times 2 = ?$	$5 \times 10 = ?$	$5 \times 4 = ?$
$6 \times 5 = ?$	$6 \times 2 = ?$	$6 \times 10 = ?$	$6 \times 4 = ?$
$7 \times 5 = ?$	$7 \times 2 = ?$	$7 \times 10 = ?$	$7 \times 4 = ?$
$8 \times 5 = ?$	$8 \times 2 = ?$	$8 \times 10 = ?$	$8 \times 4 = ?$
$9 \times 5 = ?$	$9 \times 2 = ?$	$9 \times 10 = ?$	$9 \times 4 = ?$
$10 \times 5 = ?$	$10 \times 2 = ?$	$10 \times 10 = ?$	$10 \times 4 = ?$
$11 \times 5 = ?$	$11 \times 2 = ?$	$11 \times 10 = ?$	$11 \times 4 = ?$
$12 \times 5 = ?$	$12 \times 2 = ?$	$12 \times 10 = ?$	$12 \times 4 = ?$

NOTE. — Make much use of games in drilling on the combinations in this table. Use flash cards.

1. How many dollars are there in 9 five-dollar bills?

The *number* of dollars is the product of 5 and 9, which is 45. There are $45.

2. If Fred sells twelve papers every day, how many will he sell in 4 days?

3. There are seven days in a week. How many days are there in 5 weeks?

4. Four years are how many months (1 year = 12 months)?

5. There are 12 inches in a foot. How many inches are there in three feet?

6. At 10 cents each what will 4 tablets cost?

Make a problem using:

7. 4×8 **9.** 2×11 **11.** 4×9 **13.** 7×4

8. 5×12 **10.** 5×9 **12.** 6×5 **14.** 11×5

1. Frank bought 9 packages of seeds at 5¢ a package. How much did they cost?

2. He planted six rows of corn with 9 hills in a row. How many hills did he plant?

3. Frank sold corn at 3 cents an ear. How much did he receive for nine ears?

4. At one time he sold 9 cucumbers at 4 cents apiece. How much did they bring?

5. With cabbages at 7 cents a head, what did he receive for 8 cabbages?

6. When he sold 7 heads of lettuce at 5 cents a head, how much did he receive?

7. Frank had 9 long rows of strawberries, and three plants died from each row. How many plants died?

8. Ruby sold 10 bouquets of sweet peas at 5¢ apiece. How much did she receive?

9. She sold 10 bunches of pansies for 10¢ apiece. How much did she receive?

10. Make a garden problem and solve it.

1. There are 64 sheets of paper in one tablet. How many sheets of paper are there in 2 tablets?

By addition	By multiplication $2 \times 64 = 128$.
64	64 Say "$2 \times 4 = 8$." Write **8.**
64	2 Say "$2 \times 6 = 12$." Write **12.**
128	128

The number of sheets is the product of 2 and 64, which is 128. There are 128 sheets of paper.

Find the answer by multiplication:

2. 43	**3.** 72	**4.** 54	**5.** 61	**6.** 70
2	2	2	2	2
7. 234	**8.** 424	**9.** 642	**10.** 714	**11.** 823
2	2	2	2	2
12. 9024	**13.** 8334	**14.** 6304	**15.** 9242	
2	2	2	2	

Multiply:

16. 8243 by 2	**19.** 6412 by 2	**22.** 7341 by 2
17. 4324 by 2	**20.** 5344 by 2	**23.** 6230 by 2
18. 9213 by 2	**21.** 8023 by 2	**24.** 9124 by 2

25. There are 250 sheets of paper in one package. How many sheets of paper are there in two packages?

26. There are 192 apples in one box. How many apples are there in two boxes?

27. There are 365 days in one year. How many days are there in two years?

1. At 32 miles an hour, how far will an automobile travel in 5 hours?

By addition

$$\begin{array}{r} 32 \\ 32 \\ 32 \\ 32 \\ 32 \\ \hline 160 \end{array}$$

By multiplication $5 \times 32 = 160$.

$$\begin{array}{r} 32 \\ 5 \\ \hline 160 \end{array}$$

Say "$5 \times 2 = 10$." Write 0, carry 1.
"$5 \times 3 = 15$; $15 + 1 = 16$." Write 16.

The number of miles is the product of 5 and 32, which is 160. The automobile travels 160 miles.

Find the answer by multiplication:

2. $\begin{array}{r} 62 \\ 5 \\ \hline \end{array}$	**3.** $\begin{array}{r} 43 \\ 5 \\ \hline \end{array}$	**4.** $\begin{array}{r} 74 \\ 5 \\ \hline \end{array}$	**5.** $\begin{array}{r} 65 \\ 5 \\ \hline \end{array}$	**6.** $\begin{array}{r} 84 \\ 5 \\ \hline \end{array}$	**7.** $\begin{array}{r} 38 \\ 5 \\ \hline \end{array}$
8. $\begin{array}{r} 745 \\ 5 \\ \hline \end{array}$	**9.** $\begin{array}{r} 634 \\ 5 \\ \hline \end{array}$	**10.** $\begin{array}{r} 967 \\ 5 \\ \hline \end{array}$	**11.** $\begin{array}{r} 826 \\ 5 \\ \hline \end{array}$	**12.** $\begin{array}{r} 728 \\ 5 \\ \hline \end{array}$	
13. $\begin{array}{r} 403 \\ 5 \\ \hline \end{array}$	**14.** $\begin{array}{r} 606 \\ 5 \\ \hline \end{array}$	**15.** $\begin{array}{r} 620 \\ 5 \\ \hline \end{array}$	**16.** $\begin{array}{r} 830 \\ 5 \\ \hline \end{array}$	**17.** $\begin{array}{r} 809 \\ 5 \\ \hline \end{array}$	
18. $\begin{array}{r} 465 \\ 5 \\ \hline \end{array}$	**19.** $\begin{array}{r} 309 \\ 5 \\ \hline \end{array}$	**20.** $\begin{array}{r} 728 \\ 5 \\ \hline \end{array}$	**21.** $\begin{array}{r} 590 \\ 5 \\ \hline \end{array}$	**22.** $\begin{array}{r} 876 \\ 5 \\ \hline \end{array}$	

23. A train travels 45 miles an hour. How far will it travel in 5 hours?

24. What will five chairs cost at $23 each?

25. There are 24 crackers in one box. How many crackers are there in 5 such boxes?

Drill in "Carrying"

Give results quickly:

1.	2.	3.
2×2 and 1	6×5 and 3	9×4 and 2
3×4 and 3	8×2 and 1	7×2 and 1
5×5 and 4	6×4 and 2	4×5 and 4
5×3 and 4	8×5 and 4	8×4 and 3
9×2 and 1	7×4 and 3	9×5 and 3

4. Multiply 23 by 5

23 5 115 *Product*	Say "5 × 3 = 15" Write 5, carry 1. "5 × 2 = 10; 10 + 1 = 11." Write 11.

Find the products:

5. 13×5	18. 62×5	31. 79×5
6. 33×5	19. 72×5	32. 68×5
7. 73×5	20. 83×5	33. 39×4
8. 24×4	21. 38×2	34. 87×2
9. 54×4	22. 94×5	35. 29×5
10. 44×5	23. 64×4	36. 38×4
11. 74×5	24. 15×4	37. 35×5
12. 63×5	25. 18×4	38. 37×5
13. 18×2	26. 38×5	39. 59×4
14. 48×2	27. 27×2	40. 68×5
15. 43×5	28. 19×4	41. 97×2
16. 14×4	29. 17×5	42. 58×5
17. 24×5	30. 47×2	43. 46×5

1. Multiply 438 by 5.

438
5
2190 *Product*

Say "5 × 8 = 40." Write **0**, carry **4**.
"5 × 3 = 15; 15 + 4 = 19." Write **9**, carry **1**.
"5 × 4 = 20; 20 + 1 = 21." Write **21**.

2. Multiply 268 by 5. **3.** 464 by 5. **4.** 568 by 5.

Find products:

5. 348 × 4	**11.** 706 × 2	**17.** 9060 × 5
6. 879 × 5	**12.** 894 × 4	**18.** 7840 × 4
7. 456 × 5	**13.** 596 × 5	**19.** 9684 × 4
8. 237 × 2	**14.** 790 × 4	**20.** 3706 × 5
9. 627 × 4	**15.** 835 × 4	**21.** 7896 × 4
10. 879 × 4	**16.** 798 × 4	**22.** 9548 × 4

23. 6534 4	**24.** 3262 5	**25.** 5296 2	**26.** 7898 4
27. 7190 4	**28.** 9471 5	**29.** 4321 2	**30.** 583 4
31. 6028 5	**32.** 3154 5	**33.** 1649 5	**34.** 2735 5
35. 3007 2	**36.** 2571 2	**37.** 8173 2	**38.** 6216 2
39. 3433 4	**40.** 5207 4	**41.** 7851 4	**42.** 2693 4

Add:

1. 9 + 17	**2.** 10 + 9	**3.** 27 + 9	**4.** 19 + 6
8 + 16	20 + 7	45 + 10	27 + 9
28 + 9	37 + 5	56 + 12	36 + 6
36 + 5	42 + 10	78 + 9	48 + 10

Find sums:

5. 48	**6.** 92	**7.** 786	**8.** 784
54	43	678	860
62	76	236	936
36	24	465	78

Subtract:

9. 17	**10.** 36	**11.** 48	**12.** 58	**13.** 75	**14.** 55
10	19	27	46	36	25

15. 724	**16.** 926	**17.** 786	**18.** 2468	**19.** 9368	**20.** 9675
168	108	198	167	6784	2786

Multiply:

By 4	By 2	By 5	By 4
21. 789	**22.** 967	**23.** 976	**24.** 7896
365	864	869	9248
248	976	378	6037
765	805	265	8695
840	290	670	8960

25. 36 + 478 + 25 + 760 + 304.

26. 24 + 610 + 9 + 709 + 624.

27. 976 + 324 + 178 + 620 + 17.

28. 125 + 78 + 240 + 62 + 784.

29. 9764 − 8276.

30. 8023 − 1765.

31. 6480 − 2357.

32. 3000 − 796.

1. Mary's breakfast consisted of a pint of milk at 7 cents, a dish of oatmeal at 4 cents, and rolls at 3 cents. How much did the breakfast cost?

2. A ball costs 25 cents and a bat costs 50 cents. What do they both cost?

3. Henry caught three fish. One weighed 6 pounds, one 3 pounds, and one 4 pounds. How much did they all weigh?

4. James earned 17 cents selling papers Monday, 19 cents Tuesday, 20 cents Wednesday, and 16 cents Thursday. How much did he earn in the four days?

5. Russell spends 15 cents for a ball, 5 cents for a pencil, and 10 cents for a tablet. How much does he spend for the three articles?

6. Harry attends school 5 days the first week, 5 days the second week, 4 the third, and 5 the fourth. How many days does he attend that month?

7. Mary did 12 examples on Monday, 14 on Tuesday, and 11 on Wednesday. How many examples did she work?

8. In a baseball game, the right fielder caught 3 fly balls, the center fielder 8, and the left fielder 7. How many did they all catch?

9. In the first grade of a school there were 21 pupils, in the second 27, and in the third 22. How many pupils are there in the three grades?

10. Margaret bought a loaf of bread for 12 cents, a quart of milk for 13 cents, and one yeast cake for 3 cents. How much money will Margaret pay the grocer?

11. Fred is 13 years old and James is 7. How much older is Fred than James?

12. George sold 19 papers and Henry 10. How many more papers did George sell than Henry?

13. Eugene earned 84 cents selling papers. How much did he have left after he spent 27 cents?

14. Ralph and Roger together caught 37 fish. Ralph caught 14. How many did Roger catch?

15. Harold has 30 cents and wishes to buy a 50-cent ball. How much more money does he need?

16. A fruit dealer bought a bunch of 127 bananas. After he had sold 72 bananas, how many had he left?

17. In a schoolroom there were 42 pupils, 26 of whom were boys. How many girls were there?

18. Twenty-nine pupils had a test in arithmetic. Six pupils failed. How many passed?

1. The conductor collects 7¢ for one fare. John's mother gave him the carfare for himself and his sister. How many fares will John pay? How many times will John pay 7¢?

2. For two fares the conductor collects $2 \times 7¢$ which is 14¢.

3. For three fares he collects $3 \times 7¢$ which is 21¢.

4. For four fares he collects how many cents?

5. For five fares he collects how many cents?

6. For six fares he collects how many cents?

7. For seven fares he collects how many cents?

8. For eight fares he collects how many cents?

9. For nine fares he collects how many cents?

10. For ten fares he collects how many cents?

11. Tell the number of days in one week. Find the number of days in 2 weeks.

12. How many days are there for each of the following:

3 wk.; 7 wk.; 6 wk.; 5 wk.; 8 wk.; 9 wk.; 4 wk.; 10 wk.

13. Give the answers for these facts.

$5 \times 7 =$	$1 \times 7 =$	$7 \times 7 =$
$2 \times 7 =$	$6 \times 7 =$	$4 \times 7 =$
$3 \times 7 =$	$9 \times 7 =$	$8 \times 7 =$

Complete and learn the following tables:

$1 \times 3 = ?$	$1 \times 6 = ?$	$1 \times 7 = ?$	$1 \times 8 = ?$
$2 \times 3 = ?$	$2 \times 6 = ?$	$2 \times 7 = ?$	$2 \times 8 = ?$
$3 \times 3 = ?$	$3 \times 6 = ?$	$3 \times 7 = ?$	$3 \times 8 = ?$
$4 \times 3 = ?$	$4 \times 6 = ?$	$4 \times 7 = ?$	$4 \times 8 = ?$
$5 \times 3 = ?$	$5 \times 6 = ?$	$5 \times 7 = ?$	$5 \times 8 = ?$
$6 \times 3 = ?$	$6 \times 6 = ?$	$6 \times 7 = ?$	$6 \times 8 = ?$
$7 \times 3 = ?$	$7 \times 6 = ?$	$7 \times 7 = ?$	$7 \times 8 = ?$
$8 \times 3 = ?$	$8 \times 6 = ?$	$8 \times 7 = ?$	$8 \times 8 = ?$
$9 \times 3 = ?$	$9 \times 6 = ?$	$9 \times 7 = ?$	$9 \times 8 = ?$
$10 \times 3 = ?$	$10 \times 6 = ?$	$10 \times 7 = ?$	$10 \times 8 = ?$
$11 \times 3 = ?$	$11 \times 6 = ?$	$11 \times 7 = ?$	$11 \times 8 = ?$
$12 \times 3 = ?$	$12 \times 6 = ?$	$12 \times 7 = ?$	$12 \times 8 = ?$

1. There are how many days in 8 weeks?

The number of days is the product of 7 and 8, which is 56. There are 56 days.

2. Nine boys had 6 marbles each. How many marbles did they all have?

3. There are 8 quarts in a peck. How many quarts are there in 4 pecks?

4. What will 9 pounds of rice cost at 8 cents a pound?

5. Which is the larger product, 8×7 or 6×9?

6. At \$8 each what will 11 baseball suits cost?

Give products rapidly:

7. 7×7	12. 6×12	17. 5×7	22. 8×6
8. 5×8	13. 9×6	18. 2×9	23. 3×11
9. 9×10	14. 8×8	19. 6×6	24. 9×8
10. 6×7	15. 9×5	20. 8×7	25. 3×6
11. 8×11	16. 9×7	21. 3×7	26. 6×11

See if you can give ten facts in **12** *seconds:*

1.	**2.**	**3.**	**4.** *a.*	*b.*
7×7	6×8	3×0	10×8	2×3
4×6	8×7	8×8	5×7	9×8
3×9	9×6	11×7	8×6	12×7
2×4	11×3	5×3	3×3	2×6
9×7	6×0	2×7	6×11	8×3
6×5	3×7	4×8	4×7	7×0
4×3	10×6	4×7	8×0	2×8
5×8	11×8	6×3	7×8	12×3
6×6	6×7	12×8	6×7	3×6
4×5	7×3	10×7	12×6	10×3

Find the products:

5. 70	**6.** 40	**7.** 30	**8.** 30	**9.** 50	**10.** 40
7	6	8	6	8	9
11. 60	**12.** 50	**13.** 30	**14.** 50	**15.** 60	**16.** 20
9	6	4	3	7	9
17. 40	**18.** 70	**19.** 80	**20.** 10	**21.** 70	**22.** 40
2	5	6	8	8	5
23. 30	**24.** 60	**25.** 20	**26.** 80	**27.** 50	**28.** 30
7	6	4	3	5	2

Multiply:

	29. By 7	**30.** By 3	**31.** By 6	**32.** By 8
a.	702	217	601	117
b.	860	800	216	208
c.	514	707	370	304

Drill in "Carrying"

Give results quickly:

1.	2.	3.	4.
$2\times2+1$	$3\times6+4$	$2\times8+4$	$4\times9+5$
$3\times2+1$	$5\times4+3$	$6\times5+3$	$8\times4+3$
$2\times5+3$	$6\times6+4$	$5\times5+1$	$4\times4+5$
$3\times4+2$	$7\times3+2$	$3\times9+3$	$3\times3+6$
$5\times3+2$	$4\times6+4$	$7\times4+3$	$7\times2+3$

5. *a*	*b*	*c*	*d*
$8\times4+5$	$7\times8+7$	$3\times9+2$	$5\times0+5$
$6\times6+4$	$8\times8+6$	$7\times7+6$	$4\times7+6$
$7\times3+3$	$3\times8+4$	$8\times6+3$	$7\times0+6$
$9\times7+6$	$7\times5+6$	$4\times0+2$	$5\times5+4$
$6\times4+5$	$8\times0+4$	$6\times3+7$	$3\times6+2$

Find products:

6. 341×3	11. 169×6	16. 1806×6
7. 779×6	12. 635×6	17. 1521×6
8. 488×7	13. 249×7	18. 1406×8
9. 672×8	14. 376×6	19. 879×4
10. 537×7	15. 207×9	20. 693×9

21. Multiply 786 by 7; by 8; by 3; and by 6.

22. Multiply 803 by 6; by 4; by 7; and by 8.

Multiply:

23.	24.	25.	26.	27.
653	462	325	433	529
3	4	5	4	6

28.	29.	30.	31.	32.
608	640	267	705	225
7	9	6	8	8

Find the products:

1. 80 × 6	2. 79 × 6	3. 43 × 6	4. 89 × 6	5. 910 × 6	6. 789 × 6
7. 19 × 7	8. 28 × 7	9. 67 × 7	10. 49 × 7	11. 830 × 7	12. 988 × 7
13. 82 × 8	14. 76 × 8	15. 69 × 8	16. 84 × 8	17. 908 × 8	18. 389 × 8
19. 35 × 4	20. 74 × 4	21. 48 × 4	22. 66 × 4	23. 930 × 4	24. 895 × 4

Multiply:

25. By 4	26. By 5	27. By 6	28. By 7	29. By 8
a. 656	*a.* 429	*a.* 394	*a.* 889	*a.* 180
b. 729	*b.* 836	*b.* 987	*b.* 708	*b.* 719
c. 408	*c.* 408	*c.* 842	*c.* 198	*c.* 667
d. 396	*d.* 219	*d.* 986	*d.* 918	*d.* 809
e. 886	*e.* 868	*e.* 308	*e.* 888	*e.* 198
f. 949	*f.* 119	*f.* 191	*f.* 779	*f.* 769

Drill on Special Combinations

1. 9×8	2. 4×7	3. 8×5	4. $7 + 8$	5. $6 + 7$
6×7	3×8	9×9	$9 + 6$	$5 + 9$
8×4	6×7	5×9	$8 + 5$	$6 + 5$
9×6	8×9	9×4	$7 + 9$	$6 + 8$
3×7	9×7	8×8	$9 + 8$	$5 + 7$

NOTE. — Let this be a daily exercise until mastered.

1. The boys in our club have taken three hikes. On the first hike we walked 5 miles, on the second 7 miles, and on the third 9 miles. How many miles have we hiked?

2. Edna had 10 stamps. She used four of them. How many did she have left?

3. John sold 24 packages of Christmas cards while his brother sold 5 packages. They earned 2¢ for every package sold. How many cents did they earn?

4. On Monday morning a newsboy was given 54 papers. He sold 50. How many did he return?

5. Walter has a daily allowance of 50 cents. He spends 30 cents for lunch and 14 cents for carfare. How many cents can be saved every day?

6. If you are absent from school for two weeks, how many days should be marked absent on your report card?

7. The milkman asked one of the boys to deliver 92 quarts of milk on our street. The boy has delivered 64 quarts. How many are still to be delivered?

8. On my desk are 10 letters. Two-cent stamps are placed on them. How many cents do the stamps cost?

Pencils 3¢ each	Notebook 5¢
Tablet 10¢	Crayons 10¢
Eraser 5¢	Penholder 5¢
Pens 1¢	Pad 7¢

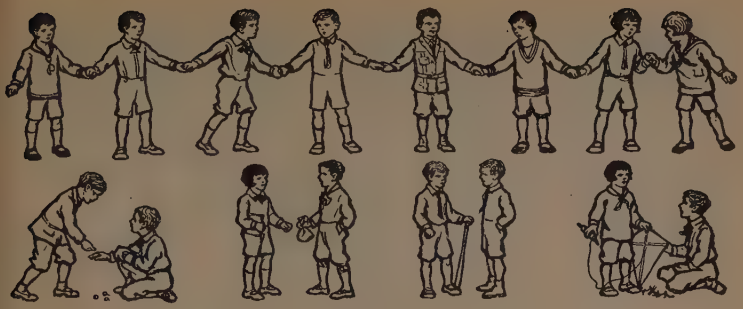
1. Mary wishes to buy one pencil and one tablet. How much money will it take to buy them? Mary has 25¢. How much change will she receive? With that change, how many pencils could she buy?

2. Name two or more things that you would like to buy. Let the class find the cost of them.

3. Choose one pupil for a clerk. Have the clerk find the cost of any three articles which a pupil may buy.

4. The teacher buys 5 pencils at this store. The clerk receives 25 cents from the teacher. How much change should the teacher have?

5. Each pupil in our class must have a notebook for spelling. The teacher will buy the notebooks at this store. Find how much money the teacher must collect from the class.



1. Four twos are how many?
2. How many twos are there in 8?

$2\overline{)8}$	How many 2's in 8?
$8 \div 2 =$	8 divided by 2 equals?

Above are two ways of writing the question "How many times is 2 contained in 8?"

Ask the questions: Give the answers:

3. $2\overline{)2}$ $2\overline{)4}$ $2\overline{)6}$ $2\overline{)8}$ $2\overline{)10}$
   $2\overline{)12}$ $2\overline{)14}$ $2\overline{)16}$ $2\overline{)18}$ $2\overline{)20}$

4. *Give the answers for the division table of 2's:*

$2 \div 2 = ?$	$12 \div 2 = ?$
$4 \div 2 = ?$	$14 \div 2 = ?$
$6 \div 2 = ?$	$16 \div 2 = ?$
$8 \div 2 = ?$	$18 \div 2 = ?$
$10 \div 2 = ?$	$20 \div 2 = ?$

5. How many 2-cent stamps will ten cents buy?
6. There are two in one pair. How many pairs will the number 16 make?
7. Find the number of 2's in each of these numbers: 10, 6, 14, 8, 12, 18, 4, 16, 20.

1. Point to one half of the apple at top of this page.

2. Point to one half of the orange.

3. One half of ten cents is how many cents?

4. Fold a sheet of paper so it will be divided into two equal parts. What would each part be called?

One half is written $\frac{1}{2}$.

5. One half of 4 quarts is how many quarts?

> One half of 4 is the same as $4 \div 2$.
> $\frac{1}{2}$ of $4 = 4 \div 2$.

6. *Find:*

$\frac{1}{2}$ of 12	$\frac{1}{2}$ of 18	$\frac{1}{2}$ of 10
$\frac{1}{2}$ of 8	$\frac{1}{2}$ of 16	$\frac{1}{2}$ of 20
$\frac{1}{2}$ of 6	$\frac{1}{2}$ of 14	$\frac{1}{2}$ of 2

7. Walter earned 36 cents selling papers, and saved $\frac{1}{2}$ of it. How many cents did he save?

8. There are 12 inches in a foot; one half a foot is how many inches?

9. There are 8 quarts in a peck. One half a peck is how many quarts?

10. How many cents in $\frac{1}{2}$ a dime?

1. Point to the whole apple at the top of this page. Point to one fourth of an apple.

2. Point to the whole melon and then to the picture of one fourth of a melon.

One fourth is written $\frac{1}{4}$.

3. $3 \times 4 = ?$

A merchant put up 12 pounds of sugar in packages holding four pounds. How many packages were there?

$$12 \div 4 = ?$$

4. Do you know these division facts?

$4 \div 4 = 1$	$20 \div 4 = 5$	$36 \div 4 = 9$
$8 \div 4 = 2$	$24 \div 4 = 6$	$40 \div 4 = 10$
$12 \div 4 = 3$	$28 \div 4 = 7$	$44 \div 4 = 11$

One fourth of 12 is the same as 12 divided by 4.

$\frac{1}{4}$ of $12 = 12 \div 4$.

5. *Find:*

$\frac{1}{4}$ of 16	$\frac{1}{4}$ of 32	$\frac{1}{4}$ of 28
$\frac{1}{4}$ of 36	$\frac{1}{4}$ of 8	$\frac{1}{4}$ of 40
$\frac{1}{4}$ of 24	$\frac{1}{4}$ of 20	$\frac{1}{4}$ of 4

How many

1. 5's are there in 5?
2. 5's are there in 10?
3. 5's are there in 15?
4. 5's are there in 20?
5. 5's are there in 25?
6. 5's are there in 30?
7. 5's are there in 35?
8. 5's are there in 40?
9. 5's are there in 45?
10. 5's are there in 50?

Divide:

11. 10 by 2
12. 15 by 5
13. 20 by 2
14. 25 by 5
15. 40 by 5
16. 30 by 5
17. 35 by 5
18. 50 by 5
19. 45 by 5
20. 55 by 5

How many

21. 4's are there in 4?
22. 4's are there in 8?
23. 4's are there in 12?
24. 4's are there in 16?
25. 4's are there in 20?
26. 4's are there in 24?
27. 4's are there in 28?
28. 4's are there in 32?
29. 4's are there in 36?
30. 4's are there in 40?

See how many answers you can give in ten seconds:

31. $40 \div 5$ **32.** $36 \div 4$ **33.** $25 \div 5$ **34.** $10 \div 2$ **35.** $45 \div 5$
36. $24 \div 2$ **37.** $48 \div 4$ **38.** $12 \div 4$ **39.** $35 \div 5$ **40.** $20 \div 2$
41. $16 \div 4$ **42.** $30 \div 5$ **43.** $18 \div 2$ **44.** $36 \div 4$ **45.** $32 \div 4$

Finish these division tables:

2's	**4's**	**5's**
$2 \div 2 = 1$	$4 \div 4 = 1$	$5 \div 5 = 1$
$4 \div 2 = 2$	$8 \div 4 = 2$	$10 \div 5 = 2$
$6 \div 2 = 3$	$12 \div 4 = 3$	$15 \div 5 = 3$

1. *Give the answers quickly:*

$3 \times 3 = ?$	$4 \times 3 = ?$	$5 \times 3 = ?$
$6 \times 3 = ?$	$7 \times 3 = ?$	$1 \times 3 = ?$
$2 \times 3 = ?$	$9 \times 3 = ?$	$8 \times 3 = ?$

2. *Do you know these division facts?*

$3 \div 3 = 1$	$15 \div 3 = 5$	$27 \div 3 = 9$
$6 \div 3 = 2$	$18 \div 3 = 6$	$30 \div 3 = 10$
$9 \div 3 = 3$	$21 \div 3 = 7$	$33 \div 3 = 11$
$12 \div 3 = 4$	$24 \div 3 = 8$	$36 \div 3 = 12$

3. *Give the answers quickly:*

> $\frac{1}{3}$ of 18 is the same as $18 \div 3$.

$\frac{1}{3}$ of $3 = ?$	$\frac{1}{3}$ of $15 = ?$	$\frac{1}{3}$ of $27 = ?$
$\frac{1}{3}$ of $6 = ?$	$\frac{1}{3}$ of $18 = ?$	$\frac{1}{3}$ of $30 = ?$
$\frac{1}{3}$ of $9 = ?$	$\frac{1}{3}$ of $21 = ?$	$\frac{1}{3}$ of $33 = ?$
$\frac{1}{3}$ of $12 = ?$	$\frac{1}{3}$ of $24 = ?$	$\frac{1}{3}$ of $36 = ?$

4. Robert bought three pencils for 15 cents. How much apiece did he pay?

5. Robert found that three tablets would cost 24 cents. How many cents would one cost?

6. Rosa had 18 cents. She put $\frac{1}{3}$ of it in her bank. How many cents did she put in her bank?

7. If 30 cents were divided equally among three boys, how many cents would each receive?

8. Three girls together picked 18 quarts of berries. That is how many quarts apiece?

9. One third of 36 in. is how many inches?

10. One third of 24 hr. is how many hours?

1. $6 \times 4 = ?$

There are 24 desks in our room. There are 6 desks in a row. How many rows are there?

$$24 \div 6 = ?$$

2. $6 \times 7 = 42$.

At \$6 a week how many weeks must a boy work to earn \$42? $42 \div 6 = ?$

3. *Give the answers quickly:*

3×6	4×6	9×6
5×6	6×6	10×6
2×6	8×6	7×6

4. *Do you know these division facts?*

$6 \div 6 = 1$	$30 \div 6 = 5$	$54 \div 6 = 9$
$12 \div 6 = 2$	$36 \div 6 = 6$	$60 \div 6 = 10$
$18 \div 6 = 3$	$42 \div 6 = 7$	$66 \div 6 = 11$
$24 \div 6 = 4$	$48 \div 6 = 8$	$72 \div 6 = 12$

5. Mr. Henderson earned \$48 in a week of six days. How many dollars did he earn in a day?

> $\frac{1}{6}$ of 48 is the same as $48 \div 6$.

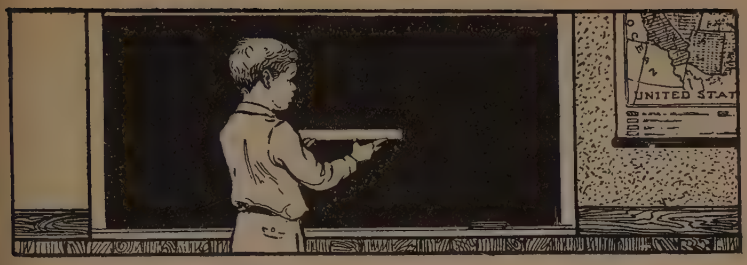
6.

$\frac{1}{6}$ of $6 = ?$	$\frac{1}{6}$ of $60 = ?$	$\frac{1}{6}$ of $54 = ?$
$\frac{1}{6}$ of $18 = ?$	$\frac{1}{6}$ of $48 = ?$	$\frac{1}{6}$ of $72 = ?$
$\frac{1}{6}$ of $42 = ?$	$\frac{1}{6}$ of $24 = ?$	$\frac{1}{6}$ of $66 = ?$
$\frac{1}{6}$ of $12 = ?$	$\frac{1}{6}$ of $30 = ?$	$\frac{1}{6}$ of $84 = ?$

7. Divide 72 dollars equally among 6 men. How many dollars would each man receive?

8. Find $\frac{1}{6}$ of 36 in.

9. Find $\frac{1}{6}$ of 66 ft.



12 inches = 1 foot.
12 in. = 1 ft.

in. stands for *inch* or *inches.*
ft. stands for *foot* or *feet.*

1. With a rule, draw a line one foot long. Divide it into 12 equal parts. What is one of these parts? How many inches make one foot?

2. How many inches are there in $\frac{1}{2}$ of a foot?

3. A foot and 2 in. are how many inches?

4. A foot and 3 in. are how many inches? Hold your hands 3 in. apart; 6 in.; 10 in.

5. How many inches wide do you think your desk is? Measure it and see.

6. How many inches are there in $\frac{1}{2}$ of a ft.? $\frac{1}{4}$ of a ft.?

7. How many feet are there in 24 inches?

8. Mary is 3 ft. tall. How many inches is that?

9. Henry is 3 ft. 2 in. tall. How many inches tall is he?

10. A foot is how many inches less than 18 in.?

In this picture, Mary is drawing a line on the blackboard with a stick three feet long called a yardstick.

1. Draw a line 1 yard long on the blackboard.

2. Find something a yard long or wide in the room.

3. How long do you think the schoolroom is? How wide? Measure it. Find something 1 yard high.

4. Name some things that are always measured by the yard.

5. Without the yardstick draw a line 1 yard long. Measure and correct it. A line 2 yards long.

6. How long do you think the blackboard is? Measure it, and see how nearly correct your estimate is.

7. Hold your hands 1 yd. apart. Hold them 1 yd. above the floor.

NOTE. — *yd.* stands for *yard* or *yards.*

8. What will 2 yards of ribbon cost at 7 cents a yard?

9. Draw a line 1 yard long at the blackboard. Divide it into 3 equal parts. What is one of these parts called?

10. How many feet high are you?

NOTE. — *ft.* stands for *foot* or *feet.*

11. Measure the height of pupils in your room.

16 ounces = 1 pound.

oz. stands for *ounce* or *ounces.*
lb. stands for *pound* or *pounds.*

1. Wallace bought a pound of butter for his mother. How many ounces did he buy?

2. Mary went to the store for half a pound of tea. How many ounces did she buy?

3. How many ounces are there in two pounds?

4. Mr. Bennett put up a pound of tea in 8-oz. packages. How many packages did it make?

5. Six ounces is how many ounces less than a pound?

6. Twelve ounces is how many ounces less than a pound?

7. A package of butter weighs 32 oz. How many pounds does it contain?

8. Florence bought four packages of candy each containing 8 oz. How many pounds of candy did she buy?

9. A box weighs 2 oz. and the candy that it contains 30 oz. Find the weight in pounds of the box and candy when weighed together.

2 pints (pt.)	=	**1 quart** (qt.)
4 quarts	=	**1 gallon** (gal.)

1. For what is the pint measure used? The quart measure? The gallon measure?

2. A quart of milk would fill how many pint bottles?

3. How many quarts of milk would be needed for 12 children if each used one pint?

4. Mr. Hunt put up three gallons of maple syrup in quart bottles. How many bottles did he use?

5. Mrs. Gray bought half a gallon of vinegar. How many quarts did she buy?

6. Mrs. Henderson put up 16 cans of pickles, using a pint of vinegar for each can. How many quarts did she use?

7. Our milkman brings cream in pint bottles. How many such bottles would be needed to hold 10 quarts?

8. Six quarts would be how many pints?

9. Four gallons would be how many quarts?

10. Name some things that are always measured by the gallon.

8 quarts (qt.)	= 1 peck (pk.)
4 pecks	= 1 bushel (bu.)

1. Can you name some things for which the bushel measure is used? The peck? The dry quart?

The dry quart is a little more than the liquid quart.

2. Half a bushel of apples is how many pecks?

3. Half a peck of potatoes is how many quarts?

4. Mr. Sanford measured out a bushel of peas, using a peck measure. How many times did he fill it?

5. Mr. Sharpe, the grocer, sold three pecks of beans a quart at a time. How many times did he fill the quart measure?

6. How many quarts are there in two pecks? In three pecks? In four pecks?

7. How many pecks are there in two bushels? In three bushels? In four bushels?

8. How many pecks are there in one bushel of peas?

9. How many quarts are there in one peck of apples?

10. Name some vegetables that your mother buys by the peck or bushel.

Mental Tests

To the Teacher. — Provide each pupil with a small rectangular piece of paper.

Have him write his name at the top, and number thus:

Jack Baker
1.
2.
3.
4.
5.

Read the example *slowly, distinctly, only once.* After a *short pause* say "*Answer.*" The pupil then writes the answer. If he does not know the answer, he draws a line.

Jack Baker
1. 16¢
2. 4¢
3. —
4. 36 in.
5. —

At the close his paper may look like this:

Collect the papers and correct them. Mark and return. See that answers are correctly labeled.

The teacher may keep on a card a record of the examples missed. This will show the *type* of problem requiring more drill.

Names of those having perfect papers may be written on the "Mental Arithmetic Honor Roll," for the day or week.

Give a test as often as twice a week. It should rarely take more than five minutes.

Test —
1. |||
2. |||| |||
3. |
4. |||
5. |||| ||||

1

1. $7 + 8 + 5 = ?$
2. $20 - 10 = ?$
3. $9 \times 3 = ?$
4. $3 \times 2 = ?$
5. Add 4 cents and 9 cents.

2

1. $10 \times 5 = ?$
2. Add 6, 5, 4, 2.
3. How many books are 4 books and 5 books?
4. $30 - 10 = ?$
5. $3 \times 3 = ?$

3

1. Add 45 and 8.
2. If a boy spends ten cents out of a quarter of a dollar, how much has he left?
3. How many are 5 and 9?
4. Add 3, 8, and 9.
5. $6 \times 9 = ?$

4

1. Add \$5, \$7, \$3.
2. $7 \times 7 = ?$
3. Twelve is how many more than 8?
4. $? \times 6 = 18$.
5. If three pencils cost 15¢, what is the cost of one?

5

1. Find the sum of 16 and 6.
2. What will 6 cakes of soap cost at 6¢ a cake?
3. Find the cost of one orange if three oranges cost 24¢.
4. Add 6¢, 8¢, 4¢.
5. If I buy a pad for 6¢ and pay for it with a dime, what change do I receive?

6

1. Add 24 and 5.
2. How many days are there in 4 weeks?
3. What number added to 8 will make 17?
4. A man has \$14 and spends \$6. How much has he left?
5. If one boy sells 11 papers and another sells 9, how many do both sell?

7

1. $38 + 8$.
2. How much more is 16 than 6?
3. What will 8 yards of cloth cost at 6¢ a yard?
4. A boy has 45¢ and his sister has 5¢ less. How much has his sister?
5. What must I pay for a ball that costs 25¢ and a pencil that costs 5¢?

8

1. Take \$8 from \$22.
2. $7 \times 7 = ?$
3. How many oranges are there in half a dozen?
4. Ten yards of ribbon cost 50¢. What will one yard cost?
5. What is the cost of a pound of rice at 12¢ and a loaf of bread at 12¢?

9

1. What will seven pounds of sugar cost at 8¢ a pound?
2. $3 \times 5¢ = ?$
3. A dime is how much more than three cents?
4. How many pounds of flour at 8¢ a pound can I buy for 40¢?
5. When you put 6¢ with 27¢, how much money have you?

10

1. 40¢ + 10¢ equals how many cents?
2. At 7¢ each what must be paid for 8 bottles of ink?
3. What is the cost of a quart of milk at 12¢ and a bottle of cream at 20¢?
4. How many inches are there in 2 feet?
5. What change will I get from a quarter if I buy 10¢ worth of candy?

11

1. How many eggs are there in one dozen?
2. $8 \times 6 = ?$
3. If I buy 8 one-cent stamps and pay for them with a dime, what change do I receive?
4. How many months in three years?
5. A boy sold nine papers on Monday, eight on Tuesday, and eight on Wednesday. How many did he sell?

Tests of Accomplishment

The following A and B tests are designed to accomplish these results:

(*a*) Develop the pupil's confidence in his ability to solve examples and problems.

(*b*) Unify the work of the term.

(*c*) Determine the types of exercises requiring more study on the part of either the individual or the class.

The tests are graded, each one slightly more difficult than the one preceding. This will develop the pupil's power to realize that he is advancing and mastering the work. If he is not mastering the work, discover the points of difficulty. The results of the tests should indicate to the teacher the types of difficulty requiring additional drill. Discover whether the type of error belongs to the class or to the individual. Give additional drill to correct errors and improve results.

I — A

1. Add 87
58
24

2. Subtract 8374
2163

3. Multiply 84 by 5.

4. $6 + 7 = ?$
$6 \times 7 = ?$

5. Write two thousand, three hundred thirty in figures.

I — B

1. Philip earned 7 cents Monday and 11 cents Tuesday. How much did he earn these two days?

2. In a room containing 42 seats, 37 are filled. How many seats are vacant?

3. Find the cost of six oranges at seven cents each.
4. Write 12 in Roman numerals.
5. Seven and what are 16?

II — A

1. Add 896
945
80

2. Subtract 9342
6431

3. Multiply 91 by 8.
4. $5 \times 7 = ?$
$7 + 5 = ?$
5. Write four thousand, eight hundred forty in figures.

II — B

1. The children in our grade sold 423 tickets for the school play. Our teacher sold 29 tickets. How many tickets did both sell?

2. In a house containing twelve rooms, five are on the first floor. How many are on the second floor?

3. What will nine chairs cost at seven dollars each?
4. Write 15 in Roman numerals.
5. One foot 4 inches are how many inches?

III — A

1. Add 98
795
805

2. Subtract 8792
982

3. Multiply 102 by 6.
4. $9 + 7 = ?$
$7 \times 9 = ?$
5. Write seven thousand, nine hundred sixty-five in figures.

III — B

1. The grocer sold 20 baskets of strawberries in the morning, 35 baskets in the afternoon, and 40 baskets in the evening. How many baskets did he sell in all?
2. Subtract 2000 from 4560.
3. Which is the larger product, 6×3 or 4×4?
4. Write 17 in Roman numerals.
5. Five quarts would be how many pints?

IV — A

1. Add 697
   894
   988
2. Subtract 3506
   1627
3. Multiply 98 by 7.
4. $7 \times 8 = ?$
   $8 + 7 = ?$
5. Write nine thousand, nine hundred eighty-seven in figures.

IV — B

1. What will it cost to send eleven letters at 2 cents each?
2. Find the cost of nine bars of soap at 4 cents each.
3. In a book containing 60 pages 24 have pictures. How many pages have no pictures?
4. Write 19 in Roman numerals.
5. Nine and what are eighteen?

V

1. Add 89
   78
   98
   69
   58
2. Subtract 3004
   1805
3. Multiply 985 by 4.
4. $9 \times 8 = ?$

THIRD GRADE — SECOND HALF

Find sums rapidly:

1. 4 and 7 54 and 7
14 and 7 64 and 7
24 and 7 74 and 7
34 and 7 84 and 7

2. 3 and 8 53 and 8
13 and 8 63 and 8
23 and 8 73 and 8
33 and 8 83 and 8

3. Add *9* to each of the following numbers:

12 32 52 42 62 82 22 72 92

4. Add *6* to each of the following numbers:

15 55 35 25 85 65 45 75 95

Add up : In example 1 say "15, 21."

1.	2.	3.	4.	5.	6.	7.	8.
6	9	7	8	6	9	7	8
6	8	6	8	8	6	5	6
9	4	8	5	7	6	9	7

9.	10.	11.	12.	13.	14.	15.	16.
3	7	8	3	6	7	6	4
5	6	6	6	7	9	9	6
4	5	9	7	9	3	3	9
7	6	8	2	8	4	6	3
24	25	23	29	33	37	35	38

17.	18.	19.	20.	21.	22.	23.	24.
7	8	3	7	8	9	7	8
8	6	6	6	3	3	8	6
9	9	5	9	5	8	6	9
7	5	8	5	4	5	2	6
14	46	13	56	27	36	59	45

Find sums rapidly:

See if you can give twelve answers in ten seconds.

1. $11 + 9$	**2.** $52 + 8$	**3.** $44 + 5$	**4.** $29 + 2$
$41 + 9$	$92 + 8$	$64 + 5$	$69 + 2$
$18 + 3$	$67 + 4$	$70 + 3$	$37 + 5$
$48 + 3$	$87 + 4$	$90 + 3$	$77 + 5$
$33 + 6$	$26 + 6$	$35 + 7$	$28 + 7$
$83 + 6$	$76 + 6$	$75 + 7$	$88 + 7$
5. $49 + 9$	**6.** $38 + 6$	**7.** $58 + 5$	**8.** $19 + 4$
$99 + 9$	$98 + 6$	$78 + 5$	$39 + 4$
$34 + 8$	$27 + 8$	$16 + 4$	$15 + 6$
$94 + 8$	$47 + 8$	$86 + 4$	$65 + 6$
$17 + 2$	$42 + 7$	$25 + 9$	$36 + 8$
$57 + 2$	$72 + 7$	$85 + 9$	$96 + 8$
9. $13 + 7$	**10.** $45 + 3$	**11.** $20 + 9$	**12.** $43 + 9$
$73 + 7$	$95 + 3$	$50 + 9$	$93 + 9$
$47 + 9$	$22 + 9$	$31 + 8$	$24 + 7$
$97 + 9$	$82 + 9$	$91 + 8$	$74 + 7$
$59 + 8$	$23 + 8$	$12 + 7$	$56 + 9$
$89 + 8$	$53 + 8$	$62 + 7$	$96 + 9$
13. $68 + 9$	**14.** $89 + 7$	**15.** $19 + 6$	**16.** $19 + 2$
$98 + 9$	$39 + 7$	$38 + 4$	$37 + 3$
$57 + 7$	$98 + 8$	$89 + 6$	$45 + 4$
$87 + 7$	$58 + 8$	$77 + 3$	$53 + 2$
$46 + 5$	$37 + 6$	$35 + 9$	$69 + 4$
$66 + 5$	$77 + 6$	$54 + 9$	$89 + 5$

Add up. In example 1 say "15, 24."

1.	2.	3.	4.	5.	6.	7.	8.
9	6	7	8	9	6	6	8
6	8	8	5	8	7	5	9
9	7	9	6	7	7	6	3

9.	10.	11.	12.	13.	14.	15.	16.
7	6	7	6	7	8	8	8
8	9	8	7	6	7	66	7
16	45	34	12	20	43	32	46

17.	18.	19.	20.	21.	22.	23.	24.
8	3	7	7	8	7	9	4
9	6	8	9	6	8	6	6
27	19	25	36	15	44	17	23

25. Add 17 cents, 8 cents, and 9 cents.
26. Add 24 dollars, 9 dollars, and 7 dollars.
27. Add 7 chairs, 8 chairs, and 25 chairs.
28. Add 7 marbles, 9 marbles, and 15 marbles.
29. Add 6 pencils, 9 pencils, and 34 pencils.
30. Add 9 rulers, 6 rulers, and 9 rulers.
31. Add 8 apples, 4 apples, and 23 apples.
32. Add 9 pears, 6 pears, and 28 pears.
33. Add 8 erasers, 9 erasers, and 3 erasers.
34. Add 3 pens, 9 pens, and 19 pens.
35. Add 6 baseballs, 5 baseballs, and 20 baseballs.
36. Add 8 pounds, 6 pounds, and 32 pounds.
37. Add 7 rifles, 8 rifles, and 46 rifles.
38. Add 9 dolls, 8 dolls, and 36 dolls.
39. Add 4 automobiles, 6 automobiles, and 25 automobiles.
40. Add 7 sweet peas, 6 sweet peas, and 32 sweet peas.

2	Add up.
9	Say "29, 37, 46, 48."
8	
3	
26	
48	*Sum*

Add:

1.	2.	3.	4.	5.	6.	7.	8.
7	5	7	8	6	3	9	6
3	2	9	4	9	7	2	2
21	30	16	21	19	24	36	42

9.	10.	11.	12.	13.	14.	15.	16.
3	4	6	5	6	9	8	9
4	5	4	3	7	5	7	8
5	7	2	6	4	7	6	7
8	4	7	7	8	8	9	6
35	28	40	18	37	26	14	25

17.	18.	19.	20.	21.	22.	23.	24.
7	8	5	7	6	6	9	3
6	3	3	8	7	4	2	6
9	4	7	6	9	5	7	7
5	6	6	9	3	3	6	4
37	49	14	37	27	20	23	42

How many seconds does it take you to add one column?

25.	26.	27.	28.	29.	30.	31.	32.
8	9	8	6	7	6	9	9
9	7	6	9	4	2	3	8
6	8	5	5	5	7	6	6
7	6	4	6	3	8	8	5
14	19	21	19	22	14	17	26

263 385 96 275 321 1340	Add up. Say "6, 12, 17, 20." Write 0. Add 2 to next column. Say "4, 11, 20, 28, 34." Write 4. Add 3 to next column. Say "6, 8, 11, 13." Write 13.

Add and time yourself (five in one minute):

1.	2.	3.	4.	5.
864	321	676	175	861
273	675	231	365	729
90	64	728	291	640
207	791	96	324	308
614	212	624	629	556

6.	7.	8.	9.	10.
1704	7967	7964	9645	7896
236	809	469	789	6234
2747	2468	2024	2345	5678
958	724	98	678	1789
6794	4789	6345	4625	6234

11. In Lucy's house there are five bookcases. In one there are 248 books, in another 184, in another 380, in another 460, in another 480. How many books are there?

12. A farmer rented a field for $75. He paid $130 for labor and $65 for seed. How much money did he invest?

13. Mr. Smith's house is worth $4800, Mr. Coy's, $6200, Mr. Thwing's $3900, Mr. Nelson's $7500 and Mr. Cheeney's $8300. How much are all five houses worth?

1. Mr. Hodge raised in one year 427 bushels of barley, 965 bushels of wheat, 993 bushels of corn, and 209 bushels of oats. How many bushels of grain did he raise?

2. Five brothers have adjoining farms of the following sizes: 140 acres, 98 acres, 215 acres, 187 acres, and 267 acres. How many acres of land do they own?

3. A poultry buyer bought during one week 237 chickens, 349 turkeys, 138 geese, and 218 ducks. How many fowls of all kinds did he buy?

4. Charlie's hens laid 211 eggs in February, 429 in March, 507 in April, 398 in May, and 286 in June. How many eggs did they lay in the five months?

5. Roy weighed seven calves for his father. Their weights were 172 lb., 184 lb., 168 lb., 196 lb., 204 lb., 179 lb., and 193 lb. What was their total weight?

6. In 1925, Mr. Smith's apple orchard yielded 187 boxes of King apples, 249 boxes of Winesaps, 832 boxes of Wagners, 721 boxes of Jonathans, 379 boxes of Greenings, and 698 boxes of Northern Spies. How many boxes of apples did the orchard yield?

7. Make a problem like number 4 which requires you to add five numbers.

Find the missing addends: Time yourself.

1.	2.	3.	4.
3+?=5	2+?=4	6+?=11	1+?=9
8+?=12	7+?=8	2+?=11	7+?=10
7+?=11	2+?=5	7+?=12	1+?=6
5+?=8	1+?=2	8+?=9	9+?=14
6+?=10	3+?=4	6+?=12	1+?=5

Find the remainders: Can you give ten correct answers in ten seconds?

5.	6.	7.	8.
9 − 6	7 − 3	6 − 2	12 − 5
9 − 4	3 − 1	7 − 4	15 − 7
8 − 1	8 − 3	6 − 5	12 − 9
13 − 9	7 − 6	6 − 3	15 − 8
9 − 2	11 − 9	8 − 2	13 − 5
10 − 2	7 − 5	10 − 8	17 − 8
9 − 7	9 − 3	10 − 3	10 − 4
18 − 9	10 − 5	12 − 3	7 − 1
11 − 8	14 − 5	4 − 4	8 − 6
16 − 9	3 − 2	7 − 2	4 − 3

9. There are 9 people in the room. I see 7 chairs. How many more chairs do I need so that all the people may be seated?

10. Four and what are nine?

11. There are 4 apples in the dish. There are six children who want apples. How many more apples are needed?

12. John's father has 4 shrubs in his yard and wishes to have 14 shrubs. How many more must he buy?

Try to give ten differences in ten seconds:

1. $16-2$	2. $4-3$	3. $9-5$	4. $8-6$	5. $9-4$
$19-2$	$8-3$	$5-5$	$10-6$	$6-4$
$2-2$	$5-3$	$7-5$	$8-7$	$9-8$
$7-2$	$10-3$	$10-5$	$10-7$	$10-9$
6. $17-5$	7. $9-4$	8. $43-7$	9. $99-9$	10. $75-9$
$17-9$	$19-8$	$33-6$	$89-9$	$65-8$
$27-9$	$29-8$	$23-8$	$79-6$	$55-7$
$37-8$	$39-9$	$13-9$	$69-5$	$45-6$

$27 - 8 = 19$

To test your answer think 19 and 8 are 27.

Subtract and prove:

11. 27	12. 39	13. 53	14. 87	15. 57	16. 44
16	13	39	28	38	38
17. 38	18. 49	19. 27	20. 59	21. 45	22. 46
27	42	18	51	36	37
23. 46	24. 54	25. 32	26. 63	27. 72	28. 45
38	47	24	56	63	38

29. A man earns \$89 and spends \$36. How much has he left?

30. A boy has 81 papers and sells 33. How many has he left to sell?

31. What change should I receive from a \$20 bill when my purchase is \$15?

Oral Drill

Give results rapidly:

1.	2.	3.	4.	5.
$24 + 7$	$37 + 6$	$29 + 5$	$69 + 9$	$48 + 4$
$38 + 5$	$39 + 8$	$98 + 8$	$73 + 6$	$37 + 7$
$73 + 9$	$43 + 4$	$63 + 7$	$56 + 8$	$54 + 7$
$45 + 4$	$54 + 5$	$72 + 9$	$96 + 6$	$64 + 9$
$66 + 5$	$53 + 8$	$49 + 6$	$87 + 7$	$88 + 9$
$78 + 7$	$49 + 7$	$84 + 6$	$54 + 9$	$78 + 6$

6.	7.	8.	9.	10.
$49 - 9$	$81 - 7$	$50 - 9$	$91 - 8$	$25 - 8$
$34 - 8$	$92 - 8$	$21 - 3$	$33 - 7$	$48 - 9$
$17 - 2$	$35 - 7$	$40 - 7$	$52 - 9$	$33 - 7$
$94 - 6$	$79 - 7$	$70 - 9$	$33 - 4$	$43 - 5$
$42 - 7$	$41 - 6$	$46 - 9$	$53 - 8$	$64 - 7$
$31 - 4$	$24 - 7$	$35 - 6$	$74 - 7$	$85 - 8$

11.	12.	13.	14.
$24 + 10$	$27 + 50$	$46 + 10$	$84 + 10$
$65 + 20$	$62 + 20$	$23 + 30$	$33 + 70$
$84 + 40$	$75 + 30$	$31 + 80$	$52 + 30$
$52 + 30$	$53 + 40$	$52 + 20$	$75 + 20$
$21 + 40$	$34 + 60$	$46 + 30$	$61 + 40$
$38 + 30$	$71 + 30$	$70 + 40$	$36 + 50$

15.	16.	17.	18.
$32 + 70$	$36 - 10$	$43 - 20$	$97 - 70$
$44 + 40$	$75 - 40$	$34 - 30$	$84 - 40$
$31 + 60$	$26 - 20$	$36 - 20$	$63 - 30$
$78 + 20$	$87 - 50$	$47 - 30$	$75 - 20$
$57 + 40$	$48 - 30$	$54 - 40$	$86 - 30$
$17 + 80$	$72 - 60$	$78 - 50$	$45 - 30$

Time yourself. Can you do five exercises in less than a minute?

231	*Minuend*	Say "5 and 6 are 11."
75	*Subtrahend*	"8 and 5 are 13."
156	*Difference*	"1 and 1 are 2."

Subtract:

1. 723	**2.** 223	**3.** 291	**4.** 613	**5.** 212
87	94	172	235	170
6. 652	**7.** 387	**8.** 916	**9.** 234	**10.** 531
375	294	322	175	380
11. 872	**12.** 301	**13.** 227	**14.** 116	**15.** 165
409	278	185	79	75
16. 219	**17.** 400	**18.** 319	**19.** 517	**20.** 320
122	135	184	224	250

21. Mr. Henry is taking an automobile trip which will cover 325 miles. He has driven 266 miles. How many miles farther has he to go?

22. How much must be added to $188 to make $275?

23. Our cafeteria needed 1000 five-cent tickets. We had 650 on hand. How many more did we have to print?

Mental Test

1. Add 5, 7 and 8.

2. How many days are there in a week?

3. A boy earns 10 cents for each errand. How much money will I pay for 2 errands?

4. A tablet cost 10 cents and a pencil 5 cents. If I buy a tablet and pencil, how much money will I spend?

5. Seven and what are 12?

1. Last year the pupils of our school sold 3897 Red Cross seals. This year we sold 5296. How many more did we sell this year than last year?

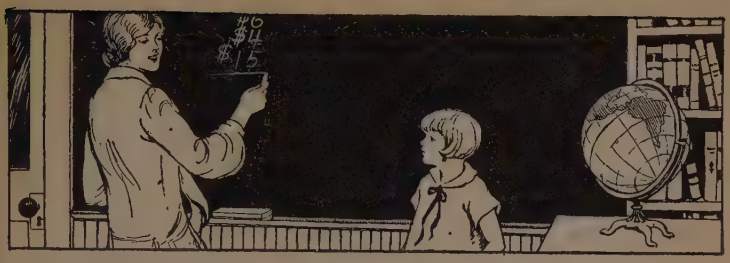
5296 *Minuend* 3897 *Subtrahend* 1399 *Difference*	Test. Subtrahend + Difference = Minuend.

Subtract and test:

2. 842 647	**3.** 435 238	**4.** 583 245	**5.** 694 598
6. 5643 2738	**7.** 4521 2618	**8.** 3462 2548	**9.** 3573 1628
10. 6411 2508	**11.** 5343 2517	**12.** 4701 2654	**13.** 3603 1672
14. 5007 2548	**15.** 3541 2496	**16.** 4504 1576	**17.** 4791 2432
18. 1240 1199	**19.** 1237 983	**20.** 8435 6598	**21.** 4605 2719
22. \$42135 14329	**23.** \$84630 29841	**24.** \$693715 48629	

25. How much added to \$436 will make \$1321?

26. Last year Mr. Finch had \$4378 in the bank. This year he has \$5247. How much has he saved in a year?



We like to make problems for one another to solve. Sometimes the teacher will give the figures. Suppose she says, "Make a problem about \$6, \$4, and \$15." One pupil may give this: "John has \$6, Henry \$4, and Marshall \$15. How many dollars have they all? And another might ask, " How much more money has Marshall than John and Henry together? "

Make and solve problems using the following:

1. \$45 *Earned*
   27 *Spent*
   Saved

2. \$70 *Selling price*
   65 *Buying price*
   Gain

3. \$80 *Buying price*
   75 *Selling price*
   Loss

4. \$32 *Cost*
   8 *Gain*
   Selling price

5. Flour and barrel, 242 pounds; barrel, 46 pounds.
6. \$125, selling price; \$100, cost.
7. \$110, selling price; \$120, cost.
8. \$25, rent; \$8, coal; \$6, milk; \$5, meat.
9. \$16, saved; \$34, spent.
10. \$25, labor; \$30, rent; \$88, seed.

1. I sold a table for \$27. It cost me \$30. Did I gain or lose and how much?

\$30 *Cost*
27 *Selling price*
\$ 3 *Loss*

I sold the table for *less* than it cost, therefore I *lost*. The *number* of dollars lost is the difference between 30 and 27, which is 3. I lost \$3.

2. Mr. Taylor bought a wagon for \$98 and sold it for \$108. Did he gain or lose, and how much?

\$108 *Selling price*
98 *Cost*
\$ 10 *Gain*

Mr. Taylor sold the wagon for *more* than it cost, therefore he gained. The *number* of dollars gained is the difference between 108 and 98, which is 10. He gained \$10.

3. Mr. Brown sold a horse for \$141. He paid \$129 for it. What did he gain?

4. Mrs. Smith bought a diamond for \$630 and sold it for \$570. How much was the loss?

5. A merchant sold for \$38 a suit which cost \$42. What was his loss?

6. A merchant buys flour for \$110, and sells it for \$130. How much does he gain?

7. Do I gain or lose, and how much, on a house which I buy for \$4300 and sell for \$4500?

8. A city lot costs \$240. It is sold for \$270. What is the gain?

9. A dealer purchased a piano for \$487 and sold it for \$324. Did he gain or lose, and how much?

10. John sold a knife for 50 cents, and so gained 5 cents. How much did the knife cost?

11. Frank lost 10 cents when he sold a ball, which cost him 60 cents. How many cents did he receive for the ball?

12. Loss, \$300. Selling price, \$700. Cost = ?

Written.

Add up, then down. Do you get the same result?

1. 621	2. 106	3. 246	4. 563	5. 462
143	342	341	692	153
152	329	697	227	278
326	406	462	209	321
243	347	374	712	145
6. 598	7. 390	8. 635	9. 264	10. 246
321	408	962	324	314
607	761	48	149	270
53	29	307	254	186
908	382	42	326	409

Find the remainders and test your work :

11. 763	12. 307	13. 625	14. 658	15. 719
528	164	218	435	217
16. 947	17. 456	18. 887	19. 715	20. 984
615	295	479	263	237
21. 935	22. 219	23. 910		24. 1725
248	136	350		932
25. 5920	26. 4937	27. 8179		28. 1865
2830	2566	1563		929
29. 1293	30. 206	31. 4371		32. 1928
509	196	856		1500

Matching Game

Column A asks the question "Two fours are what?"
Column B gives the answer "Eight."
Cover column B.
See how many answers you can write correctly for column A.

A—I	B—I	A—II	B—II
2×4	8	5×5	25
4×4	16	6×3	18
7×3	21	7×8	56
5×8	40	5×4	20
2×6	12	6×6	36
7×0	0	3×5	15
8×2	16	8×4	32
6×5	30	9×2	18
3×4	12	6×8	48
1×5	5	8×8	64

See if you can give correctly ten products in 12 seconds:

7	3	5	0	6	8	6	7	3	8
7	8	7	5	7	2	9	4	3	9

Multiply:

By 5	By 7	By 6	By 8
248	124	968	762
936	678	786	783
684	246	936	648
463	924	248	450
789	625	720	624

1. How many boys play baseball here?
2. How many boys are there in two such baseball teams?
3. Two times nine are how many?
4. Three times 9 are how many? $9 + 9 + 9$
5. $1 \times 9 = 9$ $2 \times 9 = 18$ $3 \times 9 = 27$
6. $9 + 9 + 9 + 9 = ?$ $4 \times 9 = 36$

$5 \times 9 = 45$ $8 \times 9 = 72$

$6 \times 9 = 54$ $9 \times 9 = 81$

$7 \times 9 = 63$ $10 \times 9 = 90$

7. *Give the answers:*

$6 \times 9,\ 3 \times 9,\ 5 \times 9,\ 8 \times 9,\ 7 \times 9,\ 2 \times 9,\ 10 \times 9$

What is the cost of

8. Nine pencils at 5¢ each?
9. Nine pads at 8¢ each?
10. Nine oranges at 4¢ each?
11. Nine car tickets at 7¢ each?
12. Nine chocolate bars at 10¢ each?
13. Nine erasers at 3¢ each?
14. *Give the answers:*

9×2 9×3 9×5 9×7

9×4 9×6 9×8 9×9

Drill in "Carrying"

Give answers quickly:

1.	2.	3.	4.
$2 \times 9 + 6$	$4 \times 9 + 5$	$9 \times 9 + 7$	$9 \times 0 + 8$
$3 \times 9 + 4$	$9 \times 2 + 3$	$4 \times 9 + 6$	$8 \times 9 + 4$
$9 \times 5 + 2$	$9 \times 6 + 8$	$7 \times 9 + 8$	$1 \times 9 + 6$
$7 \times 9 + 7$	$5 \times 9 + 5$	$9 \times 3 + 6$	$9 \times 9 + 4$
$6 \times 9 + 3$	$8 \times 9 + 6$	$6 \times 9 + 3$	$9 \times 6 + 7$

Multiply 694 by 9.

694 *Multiplicand*
9 *Multiplier*
6246 *Product*

Say "$9 \times 4 = 36$." Write **6**, carry 3.
"$9 \times 9 = 81$; $81 + 3 = 84$." Write **4**, carry 8.
"$9 \times 6 = 54$; $54 + 8 = 62$." Write **62**.

Find products: time yourself.

5. 789×9	**10.** 4268×9	**15.** 6402×9
6. 69×9	**11.** 2760×9	**16.** 780×9
7. 824×9	**12.** 678×9	**17.** 6054×9
8. 360×9	**13.** 5065×9	**18.** 4235×9
9. 246×9	**14.** 7680×9	**19.** 7240×9

20. The multiplicand is 245 and the multiplier 9. Find the product.

21. The multiplier is 9 and the multiplicand 4250. Find the product.

22. Find the product, when the multiplier is 9 and the multiplicand is 263.

23. Find the product, when the multiplicand is 789 and the multiplier is 9.

$8 \times 4 = ?$

8 *Multiplicand*		4 *Multiplicand*
4 *Multiplier*	or	8 *Multiplier*
32 *Product*		32 *Product*

The **factors** are the numbers multiplied together.
The **multiplicand** is the factor multiplied.
The **multiplier** is the factor by which we multiply.
The **product** is the result of multiplication.

Find the products :

1. 3×9	**4.** 8×9	**7.** 6×4	**10.** 4×10
2. 8×7	**5.** 7×6	**8.** 7×3	**11.** 8×8
3. 6×9	**6.** 7×9	**9.** 8×10	**12.** 5×9

Give the factors for these products :

13. 64	**18.** 21	**23.** 30	**28.** 48
14. 24	**19.** 18	**24.** 25	**29.** 32
15. 36	**20.** 45	**25.** 56	**30.** 27
16. 54	**21.** 63	**26.** 42	**31.** 49
17. 10	**22.** 72	**27.** 16	**32.** 40

Read quickly and supply the missing factor :

33. $2 \times ? = 20$	**38.** $? \times 8 = 64$	**43.** $? \times 4 = 16$
34. $8 \times ? = 24$	**39.** $? \times 7 = 63$	**44.** $8 \times ? = 56$
35. $3 \times ? = 21$	**40.** $6 \times ? = 36$	**45.** $? \times 5 = 25$
36. $? \times 9 = 27$	**41.** $? \times 10 = 80$	**46.** $6 \times ? = 42$
37. $8 \times ? = 24$	**42.** $? \times 3 = 15$	**47.** $3 \times ? = 18$

48. How much must I pay for 8 bars of soap at 7 cents a bar?

49. At $3 each, what will 7 books cost?

1. There are 8 rooms in our school and 32 seats in each room. How many seats are there in the school?

32	Say, "8 times 2 are 16."
8	Write 6 under 8. Carry 1.
256	Say, "8 times 3 are 24, and 1 are 25." Write 25.

Multiply

2. 69 × 2	**3.** 79 × 2	**4.** 65 × 3	**5.** 78 × 7	**6.** 431 × 4
7. 82 × 8	**8.** 531 × 3	**9.** 263 × 3	**10.** 984 × 8	**11.** 782 × 3
12. 243 × 3	**13.** 45 × 6	**14.** 85 × 6	**15.** 873 × 2	**16.** 408 × 5
17. 283 × 2	**18.** 484 × 8	**19.** 382 × 9	**20.** 651 × 5	**21.** 518 × 6
22. 719 × 9	**23.** 162 × 8	**24.** 591 × 5	**25.** 809 × 8	**26.** 415 × 6
27. 542 × 5	**28.** 6621 × 9	**29.** 247 × 7	**30.** 921 × 4	**31.** 450 × 7
32. 1708 × 9	**33.** 1605 × 4	**34.** 4283 × 7	**35.** 3484 × 2	

1. How many pens are there in 5 boxes if each box contains 144 pens?

$$\begin{array}{r} 144 \\ 5 \\ \hline 720 \end{array}$$

The *number* of pens is the *product* of 5 and 144, which is 720. There are 720 pens.

2. How many sheets of paper are there in 6 tablets, each tablet having 35 sheets?

3. One yard is 36 inches. There are how many inches in 7 yards?

4. There are how many apple trees in 6 rows if there are 15 in a row?

5. How many pounds are there in 5 sacks of flour, there being 49 pounds in a sack?

6. What will 12 chairs cost at $3 each?

$$\begin{array}{r} 12 \\ 3 \\ \hline 36 \end{array}$$

The *number* of dollars the chairs will cost is the *product* of 12 and 3 which is 36. The chairs will cost $36.

7. What does it cost to ride 30 miles on the train at 3 cents a mile?

8. How many pounds of flour are there in 4 barrels, each containing 196 pounds?

9. A train of 9 cars has 65 passengers in each car. There are how many passengers in all?

10. At $7 apiece what is the cost of 24 boy-scout suits?

6×10	$= 60$	
6×100	$= 600$	
6×1000	$= 6000$	

1.	$5 \times 10 = ?$	$5 \times 100 = ?$	$5 \times 1000 = ?$
2.	$9 \times 10 = ?$	$9 \times 100 = ?$	$9 \times 1000 = ?$
3.	$8 \times 10 = ?$	$8 \times 100 = ?$	$8 \times 1000 = ?$
4.	$4 \times 10 = ?$	$4 \times 100 = ?$	$4 \times 1000 = ?$
5.	$7 \times 10 = ?$	$7 \times 100 = ?$	$7 \times 1000 = ?$
6.	$3 \times 10 = ?$	$3 \times 100 = ?$	$3 \times 1000 = ?$

65	67	69
10	100	1000
650	6700	69000

7. *Multiply by* 10:
   7; 43; 55; 79; 3; 436; 581; 32; 48
8. *Multiply by* 100:
   8; 9; 7; 4; 14; 18; 81; 37; 40; 60; 24
9. *Multiply by* 1000:
   2; 8; 12; 61; 19; 83; 10; 42; 36; 20
10. 70 is how many times 7?
11. 700 is how many times 70?

Mental Test

1. Find the sum of 6, 5, and 4.
2. How many cents are there in a dollar?
3. What number subtracted from 12 leaves 6?
4. 12 is how much more than 9?
5. 12 is how many times 4?

Written.

1. If one horse is worth $225, what are 30 such horses worth?

$$\begin{array}{r} \$225 \\ \times \quad 30 \\ \hline \$6750 \end{array}$$ *Answer*

$30 = 3 \times 10$. Multiplying by 30 is the same as multiplying by 3 and then by 10. How do we multiply by 10?

Multiply; make problems:

2. 356 by 20.	6. 392 by 60.	10. 89 by 90.
3. 421 by 50.	7. 846 by 70.	11. 60 by 70.
4. 796 by 30.	8. 924 by 90.	12. 990 by 50.
5. 981 by 40.	9. 99 by 80.	13. 760 by 50.

14. At $29 apiece, what will 700 automobile tires cost?

$$\begin{array}{r} \$29 \\ \times \quad 700 \\ \hline \$20300 \end{array}$$ *Answer*

Multiply:

15. 95 by 700.	20. 64 by 200.	25. 77 by 90.
16. 87 by 700.	21. 139 by 200.	26. 38 by 60.
17. 87 by 300.	22. 460 by 800.	27. 128 by 50.
18. 92 by 400.	23. 791 by 300.	28. 36 by 9000.
19. 39 by 900.	24. 9 by 900.	29. 381 by 7000.

1. Mr. Johnson sells threshing machines at $537 apiece. How much does he receive for 39 machines?

537 39 4833 = 537 × 9 1611 = 537 × 30 20943	39 = 9 + 30; therefore, we may multiply 537 by 9 and by 30 and add the products. 4833 and 16,110 are called partial products. The 0 is omitted from units' place in the second partial product.

Multiply:

2.	127 34	3.	206 25	4.	346 15	5.	710 32	6.	532 21	7.	712 33
8.	543 22	9.	763 13	10.	274 16	11.	148 14	12.	714 25	13.	324 34
14.	212 16	15.	742 24	16.	632 70	17.	427 63	18.	654 37	19.	475 38
20.	749 67	21.	746 78	22.	807 89	23.	237 78	24.	415 69	25.	474 68

26. If a coal car carries 35 tons, how many tons will a train of 42 such cars carry?

27. A factory makes 2389 pairs of shoes daily. How many pairs will it turn out at that rate in 90 days?

28. There are 428 teachers in a city and 37 pupils to a teacher. There are how many pupils in all?

29. How many miles will a train go in 19 hours at the rate of 42 miles an hour?

1. What will 208 uniforms cost at $45 apiece?

208 45 1040 832 9360	Either factor may be used as the multiplier. It is more convenient to use the smaller factor.

Find products and test as shown above :

2.	79×63	**10.**	909×72	**18.**	714×598
3.	87×102	**11.**	365×13	**19.**	298×841
4.	23×95	**12.**	92×68	**20.**	887×604
5.	805×12	**13.**	52×27	**21.**	586×304
6.	36×208	**14.**	234×405	**22.**	710×508
7.	93×93	**15.**	617×109	**23.**	404×305
8.	309×27	**16.**	1250×95	**24.**	803×260
9.	850×66	**17.**	762×839	**25.**	35×42

26. A mile is 5280 ft. How many feet are there in 17 miles?

27. Mr. Rich earns $37 a week. How much does he earn in 45 weeks?

28. There are 24 hours in a day. How many hours are there in 64 days?

29. Mr. Henry's automobile goes 17 miles on a gallon of gasoline. How far will it go on 185 gallons?

30. A farmer raised seventy-six tons of hay. He sold it at eighteen dollars a ton. What amount did he receive?

31. Mr. Smith's automobile weighs 2880 lb. What will 9 such automobiles weigh?

Multiply :

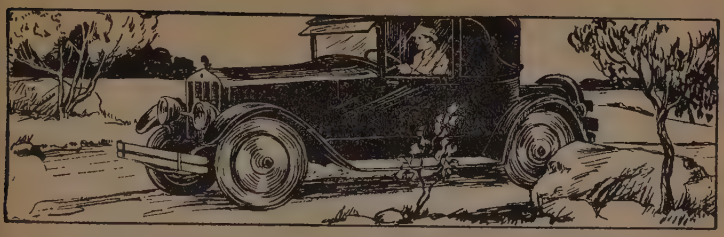
1. 12 × 21	**5.** 15 × 73	**9.** 136 × 11	**13.** 525 × 57	**17.** 1236 × 13
2. 26 × 33	**6.** 83 × 84	**10.** 215 × 36	**14.** 615 × 61	**18.** 3682 × 39
3. 34 × 42	**7.** 81 × 92	**11.** 421 × 22	**15.** 607 × 79	**19.** 5036 × 49
4. 85 × 62	**8.** 78 × 94	**12.** 409 × 41	**16.** 806 × 84	**20.** 6303 × 98

Multiply :

21. 24 by 82.	**28.** 920 by 93.	**35.** 7503 by 97.
22. 27 by 73.	**29.** 175 by 99.	**36.** 7370 by 90.
23. 55 by 64.	**30.** 237 by 88.	**37.** 6357 by 22.
24. 67 by 53.	**31.** 394 by 71.	**38.** 5624 by 38.
25. 32 by 46.	**32.** 412 by 68.	**39.** 4802 by 44.
26. 45 by 37.	**33.** 506 by 59.	**40.** 3824 by 54.
27. 56 by 25.	**34.** 635 by 48.	**41.** 2517 by 67.

Find products :

42. 65×18.	**49.** 785×35.	**56.** 6048×78.
43. 74×14.	**50.** 146×27.	**57.** 1767×70.
44. 63×23.	**51.** 529×19.	**58.** 1429×95.
45. 66×31.	**52.** 310×16.	**59.** 2057×88.
46. 43×40.	**53.** 460×24.	**60.** 3246×74.
47. 45×53.	**54.** 594×36.	**61.** 4135×65.
48. 72×64.	**55.** 601×44.	**62.** 6053×45.



1. Mr. Coman's automobile uses a gallon of gasoline in running 23 miles. How many miles can it run with 19 gallons of gasoline?

2. Mr. Whitmore brought 75 boxes of peaches to market, each box containing 76 peaches. How many peaches were there in all?

3. Our grocer bought a carload of potatoes. It contained 595 sacks, each weighing 75 pounds. Find the entire weight of the potatoes.

4. Ellen's brother earns $85 a month. How much does he earn in 27 months?

5. There are 558 teachers in the schools of our city. If there are 29 pupils for each teacher, how many pupils are there in our schools?

6. A clothing factory made 2429 overcoats worth $19 apiece. How much were they worth?

7. Henry had 27 dollars in the bank and Jay had 4 times as much. How much money did Jay have in the bank?

8. There are 24 rulers in each of the 12 rooms of the Lincoln school. How many rulers did the school have?

9. Mr. Kelly's car will go 18 miles on a gallon of gasoline. How many miles can it go on 15 gallons of gasoline?

1. $20+10$	**2.** $40+20$	**3.** $20+70$	**4.** $40+50$
$30+10$	$40+30$	$20+80$	$60+40$
$20+20$	$50+20$	$20+90$	$70+40$
$30+30$	$60+20$	$50+30$	$50+80$
$30+20$	$70+10$	$30+60$	$90+60$

5. $70-20$	**6.** $80-40$	**7.** $60-40$	**8.** $50-30$
$90-10$	$90-30$	$70-50$	$70-60$
$50-20$	$70-10$	$30-20$	$90-40$
$30-10$	$60-20$	$80-50$	$70-40$
$60-30$	$90-80$	$90-60$	$80-20$

9. 10×8	**10.** 30×4	**11.** 50×7	**12.** 6×20
20×2	50×3	60×8	3×80
60×3	70×3	30×6	5×90
40×5	60×2	40×9	2×60
70×2	90×4	80×2	7×30

13. $25+10$	**14.** $16+40$	**15.** $39+10$	**16.** $76+20$
$45+20$	$27+30$	$84+10$	$24+50$
$35+30$	$58+20$	$21+30$	$19+80$
$65+10$	$85+10$	$35+20$	$72+20$
$35+20$	$17+40$	$42+30$	$61+30$

17. $26-10$	**18.** $73-50$	**19.** $89-50$	**20.** $83-50$
$42-10$	$84-20$	$72-40$	$79-20$
$83-20$	$96-30$	$99-70$	$92-80$
$56-30$	$88-50$	$83-40$	$61-30$
$27-10$	$79-60$	$64-50$	$82-60$

$12 \div 4 = 3$

12 *divided by* 4 *equals* 3

$4\overline{)12}$ 3

This is an example in **division**.

12 is the **dividend**.

4 is the **divisor**.

3 is the **quotient**.

Read and give the quotients:

1.	$6 \div 2$	**6.**	$12 \div 3$	**11.**	$16 \div 2$	**16.**	$24 \div 4$
2.	$9 \div 3$	**7.**	$25 \div 5$	**12.**	$36 \div 6$	**17.**	$42 \div 6$
3.	$10 \div 5$	**8.**	$18 \div 3$	**13.**	$35 \div 5$	**18.**	$16 \div 4$
4.	$14 \div 2$	**9.**	$30 \div 6$	**14.**	$27 \div 3$	**19.**	$54 \div 6$
5.	$15 \div 3$	**10.**	$20 \div 4$	**15.**	$45 \div 5$	**20.**	$48 \div 6$

$4 \times ? = 12$ is solved the same as $12 \div 4 = ?$

Read, giving the missing number:

21.	$2 \times ? = 4$	**28.**	$? \times 5 = 40$	**35.**	$9 \times ? = 81$
22.	$2 \times ? = 8$	**29.**	$? \times 6 = 36$	**36.**	$? \times 3 = 30$
23.	$3 \times ? = 21$	**30.**	$? \times 7 = 49$	**37.**	$? \times 4 = 40$
24.	$4 \times ? = 32$	**31.**	$8 \times ? = 56$	**38.**	$? \times 2 = 24$
25.	$2 \times ? = 18$	**32.**	$9 \times ? = 54$	**39.**	$4 \times ? = 8$
26.	$? \times 3 = 24$	**33.**	$? \times 8 = 64$	**40.**	$5 \times ? = 50$
27.	$? \times 4 = 28$	**34.**	$? \times 9 = 72$	**41.**	$8 \times ? = 48$

42. At 2 cents each how many apples can be bought for 6 cents?

43. How many 3-cent stamps will 12 cents buy?

44. How many 5-cent pencils will 25 cents buy?

$$\begin{array}{r} 3 \text{ } \textit{Quotient} \\ 4\overline{)12} \end{array}$$

Say "4 in 12 *three times.*" Write **3** *directly above* the 2.

Find the quotients:

1. $16 \div 2$	**5.** $15 \div 3$	**9.** $20 \div 4$	**13.** $12 \div 2$
2. $18 \div 3$	**6.** $14 \div 2$	**10.** $25 \div 5$	**14.** $20 \div 5$
3. $12 \div 3$	**7.** $21 \div 3$	**11.** $24 \div 3$	**15.** $15 \div 3$
4. $28 \div 4$	**8.** $32 \div 4$	**12.** $10 \div 5$	**16.** $40 \div 5$

$12 \div 4$ is sometimes written $\frac{12}{4}$.

17. $\frac{24}{4}$	**21.** $\frac{36}{4}$	**25.** $\frac{27}{3}$	**29.** $\frac{8}{4}$
18. $\frac{10}{2}$	**22.** $\frac{18}{2}$	**26.** $\frac{4}{4}$	**30.** $\frac{5}{5}$
19. $\frac{9}{3}$	**23.** $\frac{12}{3}$	**27.** $\frac{10}{5}$	**31.** $\frac{30}{5}$
20. $\frac{14}{2}$	**24.** $\frac{45}{5}$	**28.** $\frac{35}{5}$	**32.** $\frac{16}{4}$

Know these division tables. How many minutes does it take you to give a division table?

6's	7's	8's	9's
$6 \div 6 = 1$	$7 \div 7 = 1$	$8 \div 8 = 1$	$9 \div 9 = 1$
$12 \div 6 = 2$	$14 \div 7 = 2$	$16 \div 8 = 2$	$18 \div 9 = 2$
$18 \div 6 = 3$	$21 \div 7 = 3$	$24 \div 8 = 3$	$27 \div 9 = 3$
$24 \div 6 = 4$	$28 \div 7 = 4$	$32 \div 8 = 4$	$36 \div 9 = 4$
$30 \div 6 = 5$	$35 \div 7 = 5$	$40 \div 8 = 5$	$45 \div 9 = 5$
$36 \div 6 = 6$	$42 \div 7 = 6$	$48 \div 8 = 6$	$54 \div 9 = 6$
$42 \div 6 = 7$	$49 \div 7 = 7$	$56 \div 8 = 7$	$63 \div 9 = 7$
$48 \div 6 = 8$	$56 \div 7 = 8$	$64 \div 8 = 8$	$72 \div 9 = 8$
$54 \div 6 = 9$	$63 \div 7 = 9$	$72 \div 8 = 9$	$81 \div 9 = 9$
$60 \div 6 = 10$	$70 \div 7 = 10$	$80 \div 8 = 10$	$90 \div 9 = 10$

12 = — 6's Think, " how many 6's are there in 12? "
14 = — 7's Think, " how many 7's are there in 14? "
16 = — 8's Think, " how many 8's are there in 16? "
18 = — 9's Think, " how many 9's are there in 18? "

Give the missing numbers:

I		II	
1.	18 = — 6's	**11.**	28 = — 7's
2.	36 = — 6's	**12.**	56 = — 7's
3.	72 = — 6's	**13.**	7 = — 7's
4.	30 = — 6's	**14.**	63 = — 7's
5.	6 = — 6's	**15.**	21 = — 7's
6.	24 = — 6's	**16.**	70 = — 7's
7.	42 = — 6's	**17.**	49 = — 7's
8.	54 = — 6's	**18.**	14 = — 7's
9.	48 = — 6's	**19.**	42 = — 7's
10.	60 = — 6's	**20.**	35 = — 7's

III		IV	
21.	32 = — 8's	**31.**	27 = — 9's
22.	80 = — 8's	**32.**	9 = — 9's
23.	16 = — 8's	**33.**	63 = — 9's
24.	56 = — 8's	**34.**	18 = — 9's
25.	8 = — 8's	**35.**	36 = — 9's
26.	72 = — 8's	**36.**	54 = — 9's
27.	24 = — 8's	**37.**	90 = — 9's
28.	48 = — 8's	**38.**	72 = — 9's
29.	64 = — 8's	**39.**	45 = — 9's
30.	40 = — 8's	**40.**	81 = — 9's

1. $7 \times 4 = ?$

Twenty-eight days are how many weeks?

$28 \div 7 = ?$

2. *Give the answers quickly:*

$7 \times 7 = ?$	$2 \times 7 = ?$	$9 \times 7 = ?$
$4 \times 7 = ?$	$8 \times 7 = ?$	$3 \times 7 = ?$
$5 \times 7 = ?$	$6 \times 7 = ?$	$12 \times 7 = ?$

3. *Do you know these division facts:*

$7 \div 7 = 1$	$35 \div 7 = 5$	$63 \div 7 = 9$
$14 \div 7 = 2$	$42 \div 7 = 6$	$70 \div 7 = 10$
$21 \div 7 = 3$	$49 \div 7 = 7$	$77 \div 7 = 11$
$28 \div 7 = 4$	$56 \div 7 = 8$	$84 \div 7 = 12$

One seventh of 14 is the same as $14 \div 7$.

$\frac{1}{7}$ of $14 = 14 \div 7$

Find:

4. $\frac{1}{7}$ of 35 cents
5. $\frac{1}{7}$ of \$56
6. $\frac{1}{7}$ of 28 boys
7. $\frac{1}{7}$ of 14 books
8. $\frac{1}{7}$ of 49 chairs
9. $\frac{1}{7}$ of 21 inches
10. $\frac{1}{7}$ of 42 miles
11. $\frac{1}{7}$ of 63 gallons
12. $\frac{1}{7}$ of 84 yards
13. $\frac{1}{7}$ of 70 feet

14. A strip of street car tickets costs 35 cents. The tickets are 7¢ each. How many tickets are there in the strip?

15. Mr. North earns \$63 a week and pays $\frac{1}{7}$ of his wages for board. What does his board cost per week?

1. $8 \times 4 = ?$

A merchant put up 32 ounces of pepper in eight ounce packages. How many packages did he make?

$32 \div 8 = ?$

2. $8 \times 3 = ?$

At eight dollars a pair how many pairs of shoes can I get for \$24?

$24 \div 8 = ?$

3. Mr. Herrick bought a set of chairs. He paid \$8 each for them. They cost \$48. How many chairs did he buy?

One eighth is written $\frac{1}{8}$.
One eighth of 24 is the same as 24 divided by 8.

$\frac{1}{8}$ of $24 = 24 \div 8$

4. *Give these answers quickly:*

8×3	8×2	8×4	8×11
8×5	8×6	8×9	8×12
8×8	8×7	8×10	8×1

5. *Do you know these division facts:*

$8 \div 8 = 1$	$40 \div 8 = 5$	$72 \div 8 = 9$
$16 \div 8 = 2$	$48 \div 8 = 6$	$80 \div 8 = 10$
$24 \div 8 = 3$	$56 \div 8 = 7$	$88 \div 8 = 11$
$32 \div 8 = 4$	$64 \div 8 = 8$	$96 \div 8 = 12$

6.

$\frac{1}{8}$ of $16 = ?$	$\frac{1}{8}$ of $8 = ?$	$\frac{1}{8}$ of $56 = ?$
$\frac{1}{8}$ of $32 = ?$	$\frac{1}{8}$ of $48 = ?$	$\frac{1}{8}$ of $72 = ?$
$\frac{1}{8}$ of $24 = ?$	$\frac{1}{8}$ of $64 = ?$	$\frac{1}{8}$ of $88 = ?$
$\frac{1}{8}$ of $40 = ?$	$\frac{1}{8}$ of $96 = ?$	$\frac{1}{8}$ of $80 = ?$

1. When 7 tablets cost 35 cents, what does one tablet cost?

The *number* of cents a tablet will cost is the *quotient* of 35 divided by 7, which is 5. One tablet costs 5 cents.

2. There are 4 glasses in a quart of milk. If I pay 12 cents for one quart, what is the cost of one glass?

3. There are 4 pecks in a bushel. There are how many bushels in 28 pecks?

4. In 54, there are how many nines?

5. William spent 28 days with his relatives in the city. How many weeks was he there?

6. Frank sold 96 eggs. How many dozens did he sell?

7. How many pencils can be bought for 40 cents, if one pencil cost 5 cents?

8. How many weeks are there in 49 days?

9. Harold sold radishes by the bunch with 9 radishes in each bunch. How many bunches can he make from 90 radishes?

10. Ribbon costs 10 cents a yard. How many yards of ribbon can Mary buy for 30 cents?

11. There are 24 pupils in the third grade. When they went to assembly, they walked in rows of two's. How many rows were there?

12. Mr. Reynolds, a florist, sells bouquets with 6 roses in a bouquet. How many bouquets are made from 54 roses?

1. $9 \times 8 = ?$

The uniforms of our baseball team cost \$72 for 9. That was how much for one uniform?

$72 \div 9 = ?$

2. Eighteen boys will make how many baseball "nines"?

Give the results quickly:

3.

2×9	7×9	3×9	5×9
6×9	8×9	4×9	3×9
10×9	11×9	1×9	12×9

One ninth is written $\frac{1}{9}$.

One ninth of 27 is the same as 27 divided by 9.

$\frac{1}{9}$ of $27 = 27 \div 9$

Master these division facts:

4.

$9 \div 9 = 1$	$45 \div 9 = 5$	$81 \div 9 = 9$
$18 \div 9 = 2$	$54 \div 9 = 6$	$90 \div 9 = 10$
$27 \div 9 = 3$	$63 \div 9 = 7$	$99 \div 9 = 11$

5. *How quickly can you give all the answers?*

$\frac{1}{9}$ of $18 = ?$	$\frac{1}{9}$ of $9 = ?$	$\frac{1}{9}$ of $90 = ?$
$\frac{1}{9}$ of $36 = ?$	$\frac{1}{9}$ of $54 = ?$	$\frac{1}{9}$ of $99 = ?$
$\frac{1}{9}$ of $45 = ?$	$\frac{1}{9}$ of $72 = ?$	$\frac{1}{9}$ of $63 = ?$

How many

1. 2's in 16?
2. 2's in 8?
3. 2's in 4?
4. 2's in 10?
5. 2's in 12?
6. 2's in 2?
7. 2's in 14?
8. 2's in 18?
9. 2's in 20?
10. 2's in 6?

11. How many 2's in 68?

$$\begin{array}{r} 34 \\ 2\overline{)68} \end{array}$$

Say, "2 in 6 three times."
Write **3** *directly above* 6.
Say, "2 in 8 four times."
Write **4** *directly above* 8.

Divide and test:

12. $2\overline{)24}$	16. $2\overline{)44}$	20. $3\overline{)36}$	24. $4\overline{)84}$
13. $2\overline{)42}$	17. $2\overline{)84}$	21. $3\overline{)96}$	25. $4\overline{)44}$
14. $2\overline{)28}$	18. $2\overline{)46}$	22. $3\overline{)99}$	26. $4\overline{)48}$
15. $2\overline{)64}$	19. $2\overline{)48}$	23. $3\overline{)39}$	27. $4\overline{)88}$

$2\overline{)86}$ $\quad 86 \div 2 = ?$ $\quad \frac{1}{2}$ of $86 = ?$ $\quad \frac{86}{2} = ?$

Above are four different ways of writing the question "How many times is 2 contained in 86?"

28. $82 \div 2$	32. $66 \div 3$	36. $\frac{63}{3}$	40. $\frac{1}{2}$ of 442
29. $244 \div 2$	33. $336 \div 3$	37. $\frac{88}{2}$	41. $\frac{1}{4}$ of 884
30. $484 \div 2$	34. $963 \div 3$	38. $\frac{424}{2}$	42. $\frac{1}{3}$ of 639
31. $682 \div 2$	35. $669 \div 3$	39. $\frac{366}{3}$	43. $\frac{1}{2}$ of 284

How many 3's in 306?

$$\begin{array}{r} 102 \\ 3\overline{)306} \end{array}$$

Say "3 in 3 once.
3 in zero no times.
3 in 6 twice."

The **dividend** is the number divided.
The **divisor** is the number by which we divide.
The **quotient** is the result of division.

Divide:

1. $2\overline{)468}$	**2.** $4\overline{)364}$	**3.** $2\overline{)824}$	**4.** $3\overline{)936}$
5. $3\overline{)639}$	**6.** $3\overline{)663}$	**7.** $3\overline{)339}$	**8.** $4\overline{)408}$
9. $4\overline{)848}$	**10.** $2\overline{)242}$	**11.** $4\overline{)404}$	**12.** $2\overline{)826}$
13. $3\overline{)360}$	**14.** $3\overline{)189}$	**15.** $2\overline{)162}$	**16.** $3\overline{)903}$
17. $4\overline{)484}$	**18.** $3\overline{)309}$	**19.** $4\overline{)208}$	**20.** $4\overline{)884}$

Find the quotient of:

21. $284 \div 2$	**22.** $460 \div 2$	**23.** $268 \div 2$	**24.** $505 \div 5$
25. $390 \div 3$	**26.** $600 \div 3$	**27.** $963 \div 3$	**28.** $639 \div 3$
29. $288 \div 4$	**30.** $164 \div 4$	**31.** $800 \div 4$	**32.** $804 \div 4$
33. $128 \div 2$	**34.** $996 \div 3$	**35.** $202 \div 2$	**36.** $684 \div 2$
37. $808 \div 2$	**38.** $408 \div 4$	**39.** $396 \div 3$	**40.** $488 \div 4$

41. The dividend is 960, the divisor is 3. Find the quotient.

42. Find the quotient when 8080 is the dividend and 4 is the divisor.

43. What is the quotient of 355 divided by 5?

44. What is the quotient when the dividend is 357 and the divisor 7?

Drill in "Carrying"

2 in 1 *no* times and 1 remainder.
2 in 2 *once*.
2 in 3 *once* and 1 remainder.
2 in 4 *twice*.

Drill as shown above:

1. By 2's to 20
2. By 3's to 30
3. By 4's to 40
4. By 5's to 50
5. By 6's to 60
6. By 7's to 70
7. By 8's to 80
8. By 9's to 90
9. By 10's to 10

2	9	5	6	3	7	10	1	8	4
18	12	19	11	17	13	16	14	20	15
24	27	23	26	22	30	25	21	29	28
32	35	33	40	38	34	31	36	39	37
46	44	47	41	48	50	45	42	49	43
58	52	57	59	51	56	53	60	55	54
66	61	65	60	64	69	63	68	62	67
72	76	79	71	75	78	80	74	77	73
84	87	90	83	89	86	82	88	85	81

10. Divide each of the numbers in the first two lines by 2.

11. Divide each of the numbers in the first three lines by 3.

12. Divide each of the numbers in the first four lines by 4; the first five lines by 5; the first six lines by 6.

4 *Quotient*,
$6\overline{)26}$ 2 *Remainder*

Say "6 in 26, *four* times and 2 remainder."

TEST: 6 × 4 + 2 = 26
Divisor × Quotient + Remainder = Dividend

Divide and test :

1. $36 \div 5$.	**6.** $77 \div 2$.	**11.** $86 \div 4$.	**16.** $22 \div 4$.
2. $43 \div 8$.	**7.** $27 \div 4$.	**12.** $44 \div 9$.	**17.** $62 \div 5$.
3. $34 \div 7$.	**8.** $36 \div 5$.	**13.** $37 \div 9$.	**18.** $78 \div 4$.
4. $64 \div 5$.	**9.** $72 \div 7$.	**14.** $68 \div 6$.	**19.** $33 \div 6$.
5. $\frac{30}{8}$.	**10.** $\frac{29}{2}$.	**15.** $\frac{25}{3}$.	**20.** $\frac{69}{4}$.

21. *Divide each of the following numbers by* 2, 3, 4, and 5, *and test your answers as above :*

14 38 23 30 19 13 11 17 28

22. *Divide each of the following numbers by* 5, 6, 7, 8, *and* 9, *and test your answers :*

52 49 55 42 46 50 59 61 41

23. *Divide each of the following numbers by* 7, 8, *and* 9, *and test your answers :*

75 67 65 70 73 74 66 63 76

24. Mr. Strong the blacksmith has 36 horseshoes. How many horses can he shoe with them?

25. There are 52 eggs in a basket, John can count out eggs, 6 at a time. How many times will he take out 6 eggs and how many eggs will be left?

26. The dividend is 46, the divisor is 7. What is the quotient? What is the remainder?

64 *Quotient*
8)512

Say "8 in 51, **6** times and 3 remainder."
Write **6** *above the 1.*
Place 3 with 2 and think 32.
Say "8 in 32, **4** times."
Write **4** *above the 2.*

TEST. 8 (Divisor) × 64 (Quotient) = 512 (Dividend)

Divide and test:

1. 316 by 6.
2. 215 by 5.
3. 427 by 7.
4. 264 by 5.
5. 378 by 4.
6. 438 ÷ 6.
7. 313 ÷ 7.
8. 234 ÷ 9.
9. $\frac{336}{4}$.
10. $\frac{256}{8}$.
11. 487 ÷ 4.
12. 402 ÷ 6.
13. 270 ÷ 8.
14. $\frac{963}{3}$.
15. $\frac{395}{5}$.

304
6)1824

Say "6 in 18, **3** times." Write **3** *above the 8.*
Say "6 in 2, 0 times and 2 remainder."
Write **0** *above the 2.*
Place 2 with 4 and think 24.
Say "6 in 24, **4** times."
Write **4** *above the 4.*

Find quotients and test:

16. 1218 ÷ 6.
17. 3256 ÷ 8.
18. 2772 ÷ 3.
19. 2075 ÷ 5.
20. $\frac{2142}{7}$.
21. 2583 ÷ 9.
22. 1708 ÷ 8.
23. 1836 ÷ 6.
24. 1744 ÷ 8.
25. $\frac{1548}{3}$.
26. 3025 ÷ 5.
27. 2618 ÷ 7.
28. 2214 ÷ 9.
29. 1446 ÷ 4.
30. $\frac{1323}{9}$.

31. Divisor 6, dividend 3036. Find quotient.
32. Divisor 8, dividend 1728. Find quotient.
33. Let each pupil make and solve a problem from one of the above examples.

1. $234 \div 6$.
2. $819 \div 9$.
3. $755 \div 7$.
4. $688 \div 8$.
5. $905 \div 7$.
6. $782 \div 5$.
7. $526 \div 4$.
8. $945 \div 3$.
9. $764 \div 7$.
10. $382 \div 9$.
11. $399 \div 7$.
12. $466 \div 8$.
13. $567 \div 6$.
14. $731 \div 5$.
15. $940 \div 4$.
16. $405 \div 3$.
17. $7407 \div 9$.
18. $8052 \div 3$.
19. $6514 \div 5$.
20. $5005 \div 7$.
21. $3507 \div 7$.
22. $5625 \div 9$.
23. $8412 \div 8$.
24. $3805 \div 6$.

25. $5\overline{)7015}$
26. $6\overline{)2640}$
27. $4\overline{)9102}$
28. $7\overline{)4620}$
29. $8\overline{)3609}$
30. $9\overline{)5500}$
31. $3\overline{)1101}$
32. $5\overline{)9432}$
33. $6\overline{)4694}$
34. $5\overline{)1111}$
35. $4\overline{)3001}$
36. $6\overline{)7980}$
37. $3\overline{)5001}$
38. $8\overline{)4904}$
39. $7\overline{)4505}$
40. $9\overline{)6507}$
41. $9\overline{)7542}$
42. $4\overline{)3601}$
43. $5\overline{)1100}$
44. $6\overline{)7711}$
45. $3\overline{)5005}$
46. $7\overline{)3640}$
47. $8\overline{)6401}$
48. $4\overline{)5621}$

49. $\frac{831}{4}$.
50. $\frac{275}{5}$.
51. $\frac{462}{6}$.
52. $\frac{918}{9}$.
53. $\frac{484}{8}$.
54. $\frac{301}{7}$.
55. $\frac{501}{5}$.
56. $\frac{272}{7}$.
57. $\frac{516}{6}$.
58. $\frac{732}{8}$.
59. $\frac{672}{6}$.
60. $\frac{359}{5}$.
61. $\frac{754}{9}$.
62. $\frac{310}{4}$.
63. $\frac{501}{3}$.
64. $\frac{712}{7}$.
65. $\frac{8262}{9}$.
66. $\frac{5536}{8}$.
67. $\frac{2643}{3}$.
68. $\frac{8608}{8}$.
69. $\frac{6040}{5}$.
70. $\frac{7362}{6}$.
71. $\frac{2054}{7}$.
72. $\frac{5466}{6}$.

Do you know these facts?

$1 \times 11 = 11$	$11 \div 11 = 1$	$\frac{1}{11}$ of $11 = ?$
$2 \times 11 = 22$	$22 \div 11 = 2$	$\frac{1}{11}$ of $22 = ?$
$3 \times 11 = 33$	$33 \div 11 = 3$	$\frac{1}{11}$ of $33 = ?$
$4 \times 11 = 44$	$44 \div 11 = 4$	$\frac{1}{11}$ of $44 = ?$
$5 \times 11 = 55$	$55 \div 11 = 5$	$\frac{1}{11}$ of $55 = ?$
$6 \times 11 = 66$	$66 \div 11 = 6$	$\frac{1}{11}$ of $66 = ?$
$7 \times 11 = 77$	$77 \div 11 = 7$	$\frac{1}{11}$ of $77 = ?$
$8 \times 11 = 88$	$88 \div 11 = 8$	$\frac{1}{11}$ of $88 = ?$
$9 \times 11 = 99$	$99 \div 11 = 9$	$\frac{1}{11}$ of $99 = ?$
$10 \times 11 = 110$	$110 \div 11 = 10$	$\frac{1}{11}$ of $110 = ?$
$11 \times 11 = 121$	$121 \div 11 = 11$	$\frac{1}{11}$ of $121 = ?$
$12 \times 11 = 132$	$132 \div 11 = 12$	$\frac{1}{11}$ of $132 = ?$

Give the results quickly:

1.	4×11	**7.**	2×11
2.	6×11	**8.**	$55 \div 11$
3.	$33 \div 11$	**9.**	3×11
4.	8×11	**10.**	10×11
5.	$99 \div 11$	**11.**	$44 \div 11$
6.	12×11	**12.**	$132 \div 11$

13. Find the cost of 9 school desks at \$11 each.

14. A parcel of ground fronting 660 ft. on the street is divided into 11 equal lots. What is the frontage of each lot?

15. Eleven men took dinner together — the total bill was \$22. What was each man's share of the bill?

16. The distance between two places is 11 miles. An auto bus makes four round trips between them every day. How many miles does the bus travel each day?

Do you know these facts?

$1 \times 12 = 12$	$12 \div 12 = 1$	$\frac{1}{12}$ of $12 = ?$
$2 \times 12 = 24$	$24 \div 12 = 2$	$\frac{1}{12}$ of $24 = ?$
$3 \times 12 = 36$	$36 \div 12 = 3$	$\frac{1}{12}$ of $36 = ?$
$4 \times 12 = 48$	$48 \div 12 = 4$	$\frac{1}{12}$ of $48 = ?$
$5 \times 12 = 60$	$60 \div 12 = 5$	$\frac{1}{12}$ of $60 = ?$
$6 \times 12 = 72$	$72 \div 12 = 6$	$\frac{1}{12}$ of $72 = ?$
$7 \times 12 = 84$	$84 \div 12 = 7$	$\frac{1}{12}$ of $84 = ?$
$8 \times 12 = 96$	$96 \div 12 = 8$	$\frac{1}{12}$ of $96 = ?$
$9 \times 12 = 108$	$108 \div 12 = 9$	$\frac{1}{12}$ of $108 = ?$
$10 \times 12 = 120$	$120 \div 12 = 10$	$\frac{1}{12}$ of $120 = ?$
$11 \times 12 = 132$	$132 \div 12 = 11$	$\frac{1}{12}$ of $132 = ?$
$12 \times 12 = 144$	$144 \div 12 = 12$	$\frac{1}{12}$ of $144 = ?$

Give the results quickly:

1. 3×12	**9.** $120 \div 12$
2. $96 \div 12$	**10.** 6×12
3. 8×12	**11.** $84 \div 12$
4. 11×12	**12.** 4×12
5. $72 \div 12$	**13.** 10×12
6. $144 \div 12$	**14.** 7×12
7. 9×12	**15.** $108 \div 12$
8. $132 \div 12$	**16.** 5×12

17. Ninety-six oranges are how many dozen?

18. What are 6 quarts of milk worth at 12¢ a quart?

19. Nine feet are how many inches?

20. In one of our large class rooms there are 7 rows of seats with 12 seats in a row. How many seats are there in the class room?

327 11)3600 3 *Remainder*	Say, "11 in 36 *three* times, and 3 remainder. 11 in 30 *twice* and 8 remainder. 11 in 80 *seven* times and 3 remainder."

Divide the following by 10; *by* 11; *by* 12:

1. 268.	**5.** 946.	**9.** 2496.	**13.** 52,081.
2. 240.	**6.** 348.	**10.** 1232.	**14.** 16,806.
3. 165.	**7.** 420.	**11.** 2460.	**15.** 33,662.
4. 300.	**8.** 704.	**12.** 3575.	**16.** 25,653.
17. $\frac{306}{11}$.	**19.** $\frac{488}{11}$.	**21.** $\frac{1476}{12}$.	**23.** $\frac{13200}{11}$.
18. $\frac{312}{12}$.	**20.** $\frac{372}{12}$.	**22.** $\frac{3861}{11}$.	**24.** $\frac{72144}{12}$.

25. One dozen equals 12. A farmer took to market 336 eggs. How many dozen were there?

26. A fruit grower stored 275 bushels of apples in 11 bins of the same size. How many bushels were stored in each bin?

27. If Jack can sell 12 papers a day, in how many days can he sell 432 papers?

28. In 804 inches, there are how many feet?

29. A clothier sold boys' suits at $10 each. How many did he sell for $180?

30. A coal dealer took in $2400 for coal at $12 a ton. How many tons did he sell?

31. Mr. Brown has $155 to invest in flour at $11 a barrel. How many barrels can he buy, and how much money will he have left?

1. A steamer travels at the rate of 11 miles an hour. How many hours will it take to travel 352 miles?

2. There are 8 pints in a gallon. How many gallons are there in 3208 pints?

3. In 3015 eggs, there are how many dozen and how many eggs remaining?

4. Lucy's strawberry bed contains 243 plants in 9 rows. How many plants are there in a row?

5. 348 inches make how many feet?

6. If a man can save $11 a month, in how many months can he save $550?

7. If the dividend is 1108, and the divisor 10, what will be the quotient and remainder?

8. How many 8-ounce boxes of candy can be put up from 3462 ounces, and how many ounces will remain?

9. I sold seven horses for eight hundred sixty-eight dollars. What was the average price?

10. Dividend, 31,584; divisor, 11. Find quotient and remainder.

11. Dividend, 26,942; divisor, 12. Find quotient and remainder.

12. Dividend, 906,525; divisor, 10. Find quotient and remainder.

1. When 4 pounds of beef cost $1.00, what will 1 pound cost?

2. When butter is 40¢ a pound, what will ¼ of a pound cost?

3. One dollar is divided equally among 5 boys. How many cents will each receive?

4. Among how many girls can 45¢ be divided if each receives 9¢?

5. How much is ¼ of 80 cents? ½ of 30 cents?

6. If Florence has 36 cents in her bank at home and takes out ⅓ of it, how much does she take out?

7. If 3 spellers cost 75 cents, what will one cost?

8. If 3 boxes of berries cost 45 cents, what does 1 box cost?

9. At 12¢ each, how many pineapples can mother buy for 72¢?

10. Four boys together earned 80 cents and shared it equally. What is each one's share?

11. When 9 quarts of string beans cost 90 cents, what is the cost of a quart?

12. If 8 oranges cost 72¢, what is the cost of 1 orange?

13. How much is ⅛ of 96¢? ⅓ of 33¢?

14. Divide $4.00 into 4 equal parts.

Make and solve problems using the following:

15. 8 cream cones, 40¢.

16. Tickets 10¢ each, 50¢

17. 80 cents, 2 lb. butter.

18. 1 car-fare 5¢, 35¢.

19. Product 48¢, factor 4¢.

20. 25¢, 5 apples.

1. There are 365 days in a common year. How many weeks are there, and how many days remainder?

The *number* of weeks will be the *quotient* of 365 divided by 7, which is 52, and 1 remainder.

2. It requires 165 books to supply all the pupils of a class, allowing 5 books to each pupil. How many pupils are in the class?

3. Six street cars when filled carry 264 passengers. How many passengers will each street car hold?

4. A grocer sells green onions by the bunch with 8 onions in a bunch. How many bunches can be made from 768 onions?

5. In a basket there are 156 eggs. How many dozen eggs are there in the basket?

6. Nine slices of bread can be cut from a small loaf of bread. How many loaves of bread are needed to obtain 288 slices?

7. John's father planted 7 hills of potatoes in a row. He planted 126 hills. How many rows did he plant?

8. Peggy's mother divided 25 pieces of candy equally among her 5 children. How many pieces did each receive?

9. Mr. Hunter took an automobile trip of 372 miles. If he averaged 12 miles on a gallon of gasoline, how many gallons of gasoline did he use?

10. Last week Mrs. Brown sold 84 eggs. How many dozen did she sell?

Oral.

Add up. In adding the first column, say, "52, 59, 64, 70," etc.

1.	2.	3.	4.	5.	6.
7	8	4	9	3	4
8	6	2	3	5	8
6	3	7	8	9	7
5	1	9	6	8	9
7	9	6	5	6	6
3	4	3	7	1	9
49	38	24	35	39	53

Written.

Subtract and test by addition:

7.	8.	9.	10.	11.
987	408	763	835	893
789	309	465	754	495

Find quotients and test by multiplication:

12. $9786 \div 7$	17. $9864 \div 8$	22. $28540 \div 5$
13. $8645 \div 7$	18. $1528 \div 8$	23. $74207 \div 7$
14. $6936 \div 4$	19. $2368 \div 8$	24. $96390 \div 9$
15. $7892 \div 4$	20. $7866 \div 9$	25. $64050 \div 5$
16. $8936 \div 4$	21. $4329 \div 9$	26. $98280 \div 9$

Mental Test

1. $9 \times 8 = ?$
2. $\frac{1}{4}$ of \$40 = ?
3. 6 five-dollar bills are how many dollars?
4. Write one thousand three hundred six.
5. $48 \div 8 = ?$

Add :

1.	2.	3.	4.	5.
324	685	487	933	8345
65	99	591	848	796
709	498	380	696	384
83	176	748	404	9565
427	390	631	79	3872
986	508	217	938	4033
45	657	50	254	5938

Subtract :

6.	7.	8.	9.	10.
700	200	589	438	4600
384	181	398	279	1376

11.	12.	13.	14.	15.
900	450	735	888	3327
357	189	607	499	1509

Multiply :

16.	17.	18.	19.	20.
483	967	382	790	4896
4	5	6	7	8

21.	22.	23.	24.	25.
403	589	763	469	3594
9	9	8	7	9

Divide :

26. $4\overline{)688}$	27. $10\overline{)332}$	28. $12\overline{)872}$	29. $11\overline{)156}$
30. $4\overline{)9100}$	31. $5\overline{)435}$	32. $10\overline{)685}$	33. $5\overline{)725}$
34. $11\overline{)635}$	35. $11\overline{)8795}$	36. $6\overline{)5142}$	37. $12\overline{)5124}$
38. $6\overline{)7872}$	39. $7\overline{)4578}$	40. $7\overline{)3801}$	41. $5\overline{)6855}$
42. $9\overline{)3807}$	43. $9\overline{)4563}$	44. $9\overline{)6102}$	45. $9\overline{)18108}$

Oral.

Give products quickly: time yourself.

	a	*b*	*c*	*d*	*e*
1.	4×1	2×1	3×3	5×6	5×1
2.	2×3	5×2	6×3	4×5	2×2
3.	4×2	3×4	4×4	6×2	1×1
4.	3×1	3×5	6×4	5×5	6×1
5.	7×1	8×1	9×1	7×2	8×2
6.	5×9	9×2	6×6	3×9	4×8
7.	3×7	5×8	3×8	6×8	6×7
8.	7×8	4×7	4×9	5×7	7×7
9.	10×1	6×11	4×12	6×10	3×10
10.	4×11	5×12	11×1	12×1	6×12
11.	2×11	4×10	2×10	3×11	5×11
12.	7×9	2×12	6×9	5×10	3×12
13.	8×8	11×12	7×11	8×9	10×11
14.	10×12	7×8	9×12	7×10	9×10
15.	8×11	6×9	8×10	8×12	7×12
16.	10×10	12×12	9×11	9×9	11×11

17. If one box of candy costs 10 cents, what will 9 boxes cost?

18. How many tablets at 12 cents each can be bought for 60 cents?

Mental Test

1. $4 + ? = 13$.
2. $? \times 3 = 12$.
3. Write one thousand three hundred seven.
4. $9 + 9 = ?$
5. 10 is how much more than 8?

$4 \times 7 = ?$

$4 \times ? = 28$ $\quad$ $28 \div 4 = ?$

$? \times 7 = 28$ $\quad$ $28 \div 7 = ?$

4 and 7 are the factors
28 is the product

When two factors are given, multiply the factors together to find the product.

The two factors say "Multiply us together and we will give you the product."

Give the products orally:

1. $3 \times 7 = ?$	**5.** $8 \times 8 = ?$	**9.** $5 \times 12 = ?$
2. $4 \times 8 = ?$	**6.** $10 \times 2 = ?$	**10.** $6 \times 8 = ?$
3. $5 \times 9 = ?$	**7.** $4 \times 9 = ?$	**11.** $3 \times 9 = ?$
4. $7 \times 9 = ?$	**8.** $10 \times 4 = ?$	**12.** $7 \times 8 = ?$

When the product and one factor are given, divide the product by the given factor to find the missing factor.

The product always says "Divide me by the given factor to find the missing factor."

Give the missing factor orally:

13. $3 \times ? = 21$	**17.** $? \times 9 = 63$	**21.** $7 \times ? = 35$
14. $? \times 7 = 21$	**18.** $? \times 20 = 40$	**22.** $? \times 9 = 36$
15. $4 \times ? = 32$	**19.** $6 \times ? = 54$	**23.** $2 \times ? = 30$
16. $? \times 8 = 32$	**20.** $? \times 7 = 56$	**24.** $10 \times ? = 100$

Supply the missing number orally:

25. $8 \times 11 = ?$	**28.** $8 \times 9 = ?$	**31.** $6 \times 7 = ?$
26. $2 \times ? = 14$	**29.** $7 \times ? = 49$	**32.** $? \times 6 = 54$
27. $10 \times ? = 90$	**30.** $? \times 9 = 45$	**33.** $8 \times ? = 56$

The multiplier and multiplicand are **factors** of the product.

The divisor and quotient are **factors** of the dividend.

1. $6 \times 7 = 42$. Which is the product? Name the factors.

2. $6 \times 8 = ?$ Is a factor or product to be found?

When two factors are given, how is the product found?

Find the products:

3. 5×9. **5.** 8×10. **7.** 2×12. **9.** 6×11.

4. 6×4. **6.** 3×9. **8.** 7×5. **10.** 4×12.

11. The factors are 4 and 8. What is the product?

12. The factors are 7 and 9. What is the product?

13. $6 \times ? = 42$. Is a factor or a product to be found?

When a factor and a product are given how is the other factor found?

Supply the missing factors:

14. $2 \times ? = 8$. **17.** $4 \times ? = 28$. **20.** $? \times 8 = 24$.

15. $5 \times ? = 15$. **18.** $9 \times ? = 81$. **21.** $2 \times ? = 14$.

16. $6 \times ? = 18$. **19.** $? \times 6 = 42$. **22.** $7 \times ? = 63$.

23. The product is 36. One factor is 12. What is the other?

24. One factor is 9. The product is 72. What is the other factor?

1. Sixteen pint bottles of milk are emptied into quart bottles. How many quart bottles are needed?

2. Mark bought 96 inches of rope for his sled. How many feet of rope did he buy?

3. A bag of sugar weighs 80 ounces. How many pounds does it weigh?

4. Henry measures the door. He finds that it is 84 inches high. Tell the number of feet that it measures.

5. Our grocer bought three gallons of maple sirup. He sold all of it in quart bottles. How many quarts did he sell?

6. A box of crackers weighs 8 ounces. How many packages must the grocer use to weigh one pound?

7. Mildred bought two packages of breakfast food, each weighing 14 ounces. How many ounces did both packages weigh?

8. Four bushels of potatoes are put up in packages, each containing one peck. How many packages are there?

9. The grocer sold six gallons of vinegar in quart bottles. How many bottles did he sell?

10. If each pupil uses 2 ounces of butter for lunches, how many ounces of butter will be required for 32 pupils? How many pounds will be used?

11. In wrapping a box, 12 inches of ribbon were used. How many yards are needed for 3 of these boxes?

12. A board 48 inches long is cut into pieces each one foot long. How many pieces are there?

1. How many inches long is this line?

2. Draw a line on your paper which is the same length as this line:

A. _____

3. Draw lines on your paper which are the same length as the following:

B. _____

C. _____

D. _____

E. _____

F. _____

G. _____

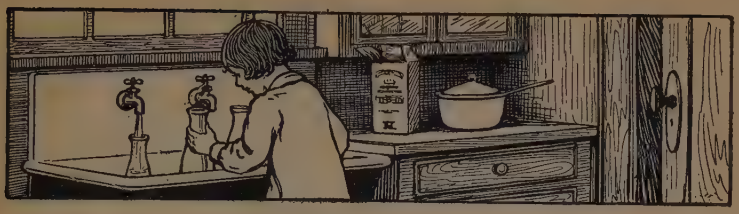
H. _____

I. _____

4. Draw a line as long as D and C taken together.
5. Draw a line as long as A and D taken together.
6. Draw a line as long as D and E taken together.
7. Draw a line as long as D and G taken together.
8. Learn to spell these words:

inch	line
one half	foot
one fourth	measure
long	together
longer	shorter

9. Use each of the above words in a sentence.



Ask mother to let you take a pint milk bottle and a quart milk bottle. How should you ask mother for the bottles?

You should say, "Please, mother, may I take a quart milk bottle and a pint milk bottle? The teacher wishes me to fill the pint bottle with water at the kitchen sink."

Mother will say, "You may take these two milk bottles to the kitchen sink. Please be careful about spilling the water."

How should you reply? You should say, "Thank you, mother. I will not spill the water."

1. Fill the smaller bottle with water. How much water is there in the bottle? How much milk will this bottle hold? What is the cost of this bottleful of milk?

2. Pour the water from the smaller bottle into the larger one. How much water is there in the larger bottle?

3. Fill the smaller bottle a second time and pour the water into the larger bottle. How much water is there in the larger bottle now? How many pints are there in one quart?

What is the cost of a large bottleful of milk?

How many pint bottles are needed to hold as much milk as one quart bottle contains? How many quart bottles are needed to hold as much milk as two pint bottles? What is the cost of one quart and one pint bottle of milk?

By the use of this chart find the cost of the milk used in your home for one week.

Day	Number of Quart Bottles	Number of Pint Bottles	Cost
Sunday			
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Total			

Ask mother to let you take a silver dollar, a half-dollar, a quarter, a dime, a five-cent piece and a cent.

How should you ask this question?

Place the dollar on a piece of cardboard and draw a line around it.

Write " One Dollar " inside the circle.

Cut out the dollar with your scissors.

In this way make four dollars, four half-dollars, eight quarters, ten dimes, ten nickels, ten cents.

1. Go to the store with mother when she buys the groceries for the day. Listen carefully to what the grocer says so that you can remember what each article costs.

When you reach home, ask mother to place the articles on the kitchen table. With your cardboard money place the price of each one with the article. Perhaps mother will look to see that each amount is correct.

Collect the money. Place the money for the cost of two articles that you may choose. Place the money for the cost of three articles that you may choose. Can you find the cost?

Go to the store each day with mother and each day play store at home. Use the money that you have made.

Which store does mother like best, a clean, light one or a dirty, dark one?

Should food be kept in a clean or a dirty place?

How does the groceryman get articles for his store?

2. Name four articles the groceryman sells by the pound.

3. Name two things he sells by the quart.

4. What does he sell by the dozen?

5. How much money will you need to buy:

a. Four boxes of matches at 6 cents each?

b. Two quarts of milk at 12 cents a quart?

c. One pound of butter at 50 cents a pound?

d. Two packages of shredded wheat at 11 cents a package?

e. One pint of milk at 7 cents, one loaf of bread at 12 cents, and one pound of crackers at 14 cents?

f. One dozen eggs at 50 cents, one quart of milk at 12 cents, one grapefruit at 10 cents, and one head of lettuce at 15 cents?

g. One dozen oranges at 40 cents, one package of raisins at 15 cents, and one yeastcake at 3 cents?

h. One box of strawberries at 25 cents and one pint of cream at 20 cents?

i. One dozen lemons at 60 cents, five pounds of sugar at 8 cents a pound?

j. Two pounds of cheese at 20 cents a pound?

6. Learn to spell these words; use each word in a sentence.

pound	butter
dollar	dozen
dime	money
nickel	head
quarter	store

7. Make a large sign like this:

CLEAN FOOD
MUST BE BOUGHT
AT A CLEAN STORE
NO DUST NO FLIES
SEE OUR STORE

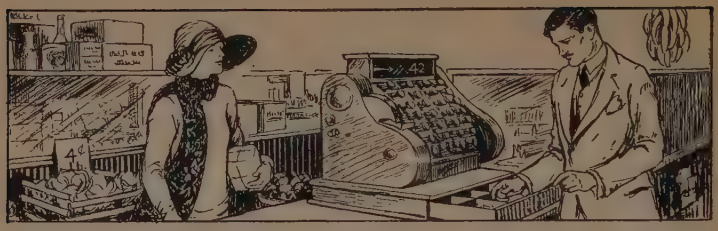
8. Should you eat candy which has been left open for flies to light on and dust to settle upon?

9. Which of the following articles should be wrapped when they are made: bread, candy, breakfast foods, butter, cheese, and cookies?

10. Which of the following articles should be kept in a cool place: butter, milk, meat, sugar, coffee, oranges, and cheese?

11. Which of the following articles should be kept covered: cookies, prunes, oranges, and crackers?

12. Take your toy money to school. Ask your teacher to let the pupils play store.



Making Change

1. Mother bought a pound of coffee for 42 cents. What change would she receive if she gave the grocer fifty cents?

2. Father bought a quart of milk at 12 cents and a loaf of bread at 12 cents. What change did he receive from a quarter?

3. Mildred bought a dozen oranges for 60 cents and a pint of cream at 20 cents. What change did she receive from a dollar?

4. I have a half-dollar and a quarter. If I buy a package of breakfast food at 11 cents and a dozen eggs at 43 cents, what change will be left?

5. Eunice bought these groceries for her mother: a pound of dried beef at 38 cents a pound, a quart of vinegar at 14 cents, and two pounds of rice for 25 cents. What change should she have from one dollar?

6. Lois bought 6 oranges for 30 cents and one pound of cheese for 28 cents. What change did she receive if she gave the grocer a fifty-cent piece and a quarter?

7. George got his hair cut for 35¢. He gave the barber a dollar bill. What change did he receive?

Find sums and test:

1.	2.	3.	4.	5.	6.
46	234	577	2708	2358	32508
94	503	236	3592	7004	97426
78	78	479	4067	352	3521
21	99	48	354	29	419
46	708	216	5912	146	7504

Find remainders and test:

7.	8.	9.	10.	11.
3568	70602	48072	50110	36215
2059	49733	39183	10502	20148

Find products and test:

12.	13.	14.	15.	16.	17.
364	409	784	615	583	698
26	85	78	97	65	57

Find quotients and test:

18. $\frac{2838}{6}$ 20. $\frac{3577}{7}$ 22. $\frac{2755}{5}$

19. $\frac{7854}{7}$ 21. $\frac{3609}{9}$ 23. $\frac{3892}{4}$

What is

24. $\frac{1}{2}$ of 30? 25. $\frac{1}{4}$ of 24? 26. $\frac{1}{5}$ of 25? 27. $\frac{1}{7}$ of 49?

Give results orally:

28. 6×7.	33. 9×8.	38. $35 \div 7$.	43. $63 \div 9$.
29. $5 + 9$.	34. $54 \div 6$.	39. $18 - 8$.	44. $32 \div 4$.
30. $18 \div 6$.	35. $16 - 7$.	40. $12 + 8$.	45. $11 + 9$.
31. $17 - 9$.	36. $8 + 7$.	41. $39 + 7$.	46. 8×7.
32. $72 \div 9$.	37. $18 + 7$.	42. 7×7.	47. $15 - 6$.

Find results and test:

48. 3754×6.	52. 2503×9.	56. 5903×7.
49. $2873 \div 5$.	53. $6421 \div 6$.	57. 6307×5.
50. 7952×4.	54. 4932×5.	58. $4509 \div 9$.
51. $8902 \div 7$.	55. $3621 \div 8$.	59. 3156×8.

Problems with Numbers Omitted

We should be able to " see through " a problem and discover how to solve it, without knowing what the numbers are.

Example A. Rufus earned —— cents on Monday and —— cents on Tuesday. How much did he earn in all?

Solution. — To find how much Rufus earned, add what he earned on Monday and what he earned on Tuesday.

Example B. Arlene made —— cookies. She gave —— cookies to each of her —— brothers and put the others into a jar. How many did she put into the jar?

Solution. — To find the number of cookies put into the jar, —

1. Multiply the number given to each boy by the number of boys.
2. Subtract that product from the number of cookies made.

Give the solutions of the following problems. First read the problem very carefully to yourself.

1. Fred sold —— copies of the *Saturday Evening Post,* Will sold ——, and Joe sold ——. How many did they all sell?

2. Mr. Robinson sold —— calves at $—— apiece. How much did he receive?

3. Mr. Felter earns $—— a year. His expenses are $——. How much does he save?

4. Mr. Burke earns $—— a year and spends —— of it. How much does he spend?

5. Mr. Jackson found —— ripe peaches on his tree. He gave —— to Mary, —— to Sue, and the rest to Robert and Earl, treating the boys alike. How many did each boy receive?

6. There are —— pupils in one school, —— in another, and —— in another. How many are there in the three schools?

7. Make a problem with numbers omitted.

Mental Tests

1

1. Add 5, 5, 2, 8.
2. $27 - 7 = ?$
3. Write three hundred twenty-one in figures.
4. Write 17 in Roman numerals.
5. At 6¢ a pint, how many pints of milk can be bought for 12¢?

2

1. $\frac{1}{4}$ of 12 = ?
2. How many inches are there in $\frac{1}{3}$ of a foot?
3. Five 3's are how many?
4. If there are four quarts in one gallon, how many quarts are there in four gallons?
5. 100 times 2 equals what?

3

1. Add 7, 3, 6, 4.
2. $39 - 9 = ?$
3. Write nine hundred five in figures.
4. What will seven stamps cost at 2¢ each?
5. Six times nine equals what?

4

1. Eight times zero equals what?
2. Six pints equals how many quarts?
3. $8 \times 7 + 3 = ?$
4. $200 \times 2 = ?$
5. How much larger is 16 than 9?

5

1. Add 9, 1, 2, 3, 5.
2. $54 - 3 = ?$
3. Write five thousand six hundred nineteen in figures.
4. What will ten oranges cost at 10¢ each?
5. At 3¢ each, how many pencils can be bought for 18¢?

6

1. How many 4's are there in 36?
2. How many quarts are there in three pecks?
3. Walter is 9 years old and Floyd is 7. How much older is Walter than Floyd?
4. Find $\frac{1}{4}$ of 16.
5. $9 \times 7 = ?$

7

1. Add 11, 4, 5, 7.
2. $49 - 7 = ?$
3. What number added to 11 makes 18?
4. $5 \times 6 + 3 = ?$
5. $14 - 2 = ?$

8

1. $\frac{1}{3}$ of $15 = ?$
2. $24 \div 6 = ?$
3. What must be paid for twelve eggs at 3¢ each?
4. How many days are there in three weeks?
5. Find the cost of a loaf of bread at 12¢ and a bar of soap at 7¢.

9

1. Write eight thousand four hundred nine in figures.
2. Clayton earned 35¢ and spent 5¢. How much had he left?
3. Find the sum of \$5, \$2, \$2, \$1.
4. $5 \times 9 + 5 = ?$
5. $8 \times 5 + 9 = ?$

10

1. Add 17, 3, 6, 4.
2. $\frac{1}{6}$ of $42 = ?$
3. Sugar costing 5¢ a pound is sold for 7¢. What is the gain on a pound?
4. Find the cost of 8 pencils at 4¢ each.
5. Three times what equals twenty-one?

11

1. $6 \times 7 + 9 = ?$
2. Add 37, 3, 9, 1.
3. Multiply 400 by 2.
4. What are the factors of 12?
5. What must be paid for 8 tin cups at 7¢ each?

12

1. Multiply six by one hundred.
2. Eighty is how many times eight?
3. Seven times what equals thirty-five?
4. Thirty-six divided by six equals what?
5. Forty-five equals how many nine's?

13

1. What is the sum of 43, 7, and 9?
2. John counted nine boys in bathing, five fishing and three building a fire. How many boys were there in all?
3. Seventeen minus nine equals what?
4. Eight and what are fifteen?
5. Arthur had fifteen papers and sold ten. How many had he left?

14

1. A coat costing $8 is sold for $10. What is the gain?
2. Find the cost of seven tickets at 6 cents each.
3. What times nine equals forty-five?
4. Nine times nine plus eight equals what?
5. Find the cost of 200 books at $2 each.

15

1. How many quarts are there in three gallons?
2. Seven times one thousand equals what?
3. Four hundred times three equals what?
4. How many days are there in five weeks?
5. What times nine equals sixty-three?

16

1. Six times what equals fifty-four?
2. Fifteen divided by three equals what?
3. Forty-nine equals how many sevens?
4. Find $\frac{1}{7}$ of 21¢.
5. At 4¢ each how many eggs can be bought for 40¢?

17

1. $\frac{1}{8}$ of 24 = ? 2. $\frac{1}{7}$ of 63 = ?
3. How many loaves of bread at 9¢ each can be bought for 81¢?
4. How many pecks are there in seven bushels?
5. What is the quotient of 55 divided by 5?

18

1. Divide 700 by 7.
2. A basket contains 36 eggs. How many dozen are there?
3. If 3 boxes of berries cost 60¢, what does one box cost?
4. Add 21, 9, 6, 3, 1. 5. 39 − 19 = ?

19

1. $12 \times 12 = ?$ 2. $7 \times ? = 56$.
3. One factor is 6 and the product is 66. What is the other factor?
4. 32 ounces equals how many pounds?
5. Write nine thousand, four.

20

1. Write 17 in Roman numerals.
2. Change 60 inches to feet.
3. A can of corn weighs 8 ounces. How many cans of corn are required to weigh 2 pounds?
4. $64 + 6 + 5 + 5 = ?$
5. $37 - 27 = ?$

Tests of Accomplishment

I

1. Add
$$\begin{array}{r} 21 \\ 35 \\ 42 \\ 81 \\ \underline{16} \end{array}$$

2. Subtract
$$\begin{array}{r} \$165 \\ \underline{93} \end{array}$$

3. Find $\frac{1}{7}$ of \$70.

4. $40 \div 8 = ?$

5. Divide 128 by 4.

II

1. Add
$$\begin{array}{r} 3864 \\ \underline{1257} \end{array}$$

2. Philip's father bought a wagon for \$79 and sold it for \$99. What did he gain?

3. Find $\frac{1}{9}$ of 108.

4. A cap cost \$3, a suit \$18, and an overcoat \$20. What was the cost of the three?

5. Multiply 85 by 1000.

III

1. Raymond earned $135 and spent $75. How much had he left?
2. Multiply 3078 by 4.
3. Divide 1708 by 8.
4. Mr. Taylor, the grocer, bought four gallons of maple sirup. He sold all of it in quart bottles. How many quarts did he sell?
5. Change 48 inches to feet.

IV

1. Find the cost of seven crates of eggs at $9 a crate.
2. Multiply 42 by 1000.
3. Divide 819 by 9.
4. Subtract 89 from 403.
5. $7 + 8 + 8 + 9 + 25 = ?$

V

1. Add 935
   487
   693
   509
   836
2. Divide 891 by 11.
3. Change 12 bushels to pecks.
4. What must be paid for 14 beds at $9 each?
5. If 7 bushels of onions cost $14, what was the cost of 1 bushel?

STANDARDIZED TESTS

ALL of the standardized tests inserted at appropriate places in the series of arithmetics are taken from Monroe's General Survey, Monroe's Diagnostic and Monroe's Standardized Reasoning Tests. The regular printed form of these tests may be secured from the Public School Publishing Co., Bloomington, Illinois.

The standardized tests given herewith set definite goals to be attained, furnish a means of measuring ability, and reveal facts not yet mastered.

The standard mentioned at the beginning of each test indicates the ability the pupil should have at the time the test is given.

Pupils should not be drilled on these tests. They should be instructed so well in general subject matter that they can meet the standard.

In using the tests, the pupils should not be permitted to write the answers in the book. In working all of the examples except those in division and common fractions, a sheet of plain paper should be placed with the edge just below the first row of examples. When this row has been completed, the pupil may turn the paper so that a fresh edge is placed under the next row of examples.

Direct the pupils to mark the place by putting the sheet of paper in the book and then to close it. Then say: "Attention! Ready, go!" At the end of the time to be allowed say: "Stop!"

STANDARDIZED TEST — ADDITION

Pupils completing the third grade should be able to write the answers to 25 of the examples given below in one minute. Fourth grade pupils should be able to do 34 examples.

1	4	6	1	9	7	0	9	3	6
2	2	6	3	5	7	1	6	0	9
2	0	1	3	3	8	9	1	7	4
4	7	5	2	8	1	9	6	6	7
8	8	2	0	2	0	3	3	4	1
0	9	5	5	7	8	1	5	6	4
7	2	5	8	6	6	7	9	5	4
9	9	8	3	0	5	2	0	1	3
2	5	9	7	7	4	4	8	0	5
2	2	3	1	8	9	0	6	0	7
3	0	9	6	2	2	4	3	5	7
4	4	1	3	8	1	8	3	9	4

STANDARDIZED TEST — SUBTRACTION

Pupils completing the third grade should be able to write the answers to 19 of the examples given below in one minute. Fourth grade pupils should be able to do about 25 examples.

9	12	7	1	11	9	8	13
9	3	3	0	6	7	1	8
4	12	12	5	8	10	11	6
3	7	6	1	0	2	9	0
11	2	15	7	10	13	12	3
7	1	8	5	9	7	4	2
10	4	1	8	6	4	15	10
5	2	1	3	3	4	9	7
13	8	10	17	9	6	5	11
5	6	1	9	4	4	5	8
5	16	12	7	15	8	5	16
0	8	9	0	6	5	3	7

STANDARDIZED TEST — MULTIPLICATION

Pupils completing the third grade should be able to write the answers to 16 of the examples given below in one minute. Fourth grade pupils should be able to do 23 examples.

3	2	9	4	0	7	5	4
2	9	8	7	2	6	6	0
4	9	9	6	5	2	4	3
1	5	1	5	2	1	8	3
7	9	0	7	7	0	1	8
0	6	5	7	4	6	6	3
2	7	3	1	9	4	2	8
8	1	8	5	9	4	0	9
4	0	4	0	1	9	6	1
3	3	5	7	4	3	2	7
8	3	6	6	0	7	3	5
8	4	8	3	0	9	9	5

STANDARDIZED TEST — DIVISION

Pupils completing the third grade should be able to write the answers to 16 of the examples given below in one minute. Fourth grade pupils should be able to do 23 examples.

$3\overline{)9}$	$7\overline{)28}$	$4\overline{)32}$	$9\overline{)9}$	$6\overline{)36}$	$3\overline{)21}$
$2\overline{)0}$	$6\overline{)48}$	$1\overline{)1}$	$7\overline{)63}$	$5\overline{)10}$	$6\overline{)0}$
$2\overline{)6}$	$8\overline{)32}$	$4\overline{)24}$	$1\overline{)8}$	$5\overline{)30}$	$1\overline{)7}$
$8\overline{)72}$	$2\overline{)10}$	$1\overline{)0}$	$7\overline{)42}$	$9\overline{)36}$	$1\overline{)1}$
$6\overline{)18}$	$1\overline{)3}$	$3\overline{)6}$	$2\overline{)8}$	$4\overline{)20}$	$6\overline{)6}$
$7\overline{)49}$	$3\overline{)27}$	$8\overline{)64}$	$3\overline{)24}$	$1\overline{)2}$	$9\overline{)63}$
$4\overline{)16}$	$2\overline{)4}$	$5\overline{)0}$	$8\overline{)24}$	$7\overline{)7}$	$7\overline{)21}$
$2\overline{)18}$	$4\overline{)4}$	$6\overline{)42}$	$3\overline{)15}$	$3\overline{)0}$	$9\overline{)81}$

STANDARDIZED TEST — ADDITION

Pupils completing the third grade should be able to write the answers to 15 of the examples given below in two minutes. Fourth grade pupils should be able to do 20 examples.

5	6	2	1	9	4	2	9
2	3	8	4	8	6	8	7
2	4	8	2	0	5	5	1
0	8	5	5	7	3	0	5
4	8	1	4	6	4	6	3
6	5	2	4	6	1	8	3
7	9	7	0	2	4	5	7
8	6	3	8	3	1	1	2
5	3	4	5	9	8	3	9
5	8	1	5	3	4	8	6
7	9	3	8	4	1	1	4
5	3	6	6	2	3	6	7
3	7	7	2	5	9	9	5
3	8	1	4	4	3	7	1
1	3	6	1	1	5	5	0
1	2	7	5	9	8	5	6
0	9	3	5	8	2	4	6
5	0	1	9	5	3	2	7
2	5	5	3	4	2	4	2
6	2	4	1	9	5	2	7

STANDARDIZED TEST — SUBTRACTION

Pupils completing the third grade should be able to write the answers to 5 examples given below in two minutes. Fourth grade pupils should be able to do 11 examples.

37	94	60	27	39	41	77
5	8	3	6	7	8	3
53	65	80	92	70	68	58
9	2	4	5	3	2	9
26	43	95	50	36	34	44
9	8	4	7	1	8	6
25	63	57	45	60	29	90
3	7	9	8	5	2	6
33	81	54	71	68	50	85
4	5	7	4	3	1	9

STANDARDIZED TEST — MULTIPLICATION

Pupils completing the third grade should be able to write the answers to 5 examples given below in five minutes. Fourth grade pupils should be able to do 10 examples.

6572 × 6	6750 × 9	5863 × 2	3754 × 5
2845 × 8	4936 × 4	9327 × 7	8274 × 3
8409 × 6	6391 × 9	5482 × 2	8609 × 5
3679 × 8	2758 × 4	4658 × 7	9653 × 3
3174 × 6	2874 × 9	7901 × 2	2179 × 5

FOURTH GRADE — FIRST HALF

Numbers of more than three figures are easily read if each group of *three figures, — counting from the right,* — is set off by a comma.

These groups are called **periods.** The name of the right-hand period is **units,** of the next is **thousands.**

407,524 is read 407 *thousand,* 524.

NOTE. — In reading numbers, the word *units* is not used. Do not use the word *and* in reading whole numbers.

Read:

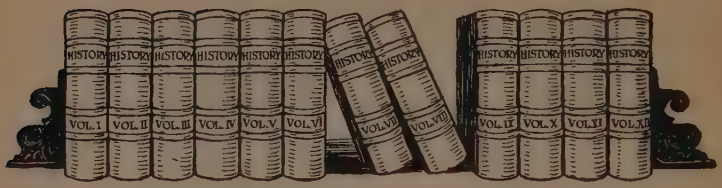
1. 3,142	**2.** 12,000	**3.** 409,112
6,402	102,012	450,246
9,544	34,141	525,464
22,301	152,210	100,000
621,200	140,209	10,014
4. 72,150	**5.** 83,104	**6.** 109,216
112,327	127,300	462,136
45,000	11,113	743,050
62,015	4,003	208,000

Write in figures:

7. Three thousand, four hundred twenty-five.

8. One hundred twenty thousand, eight hundred.

Roman Numerals



Numbers written in letters are called Roman numerals because they were used by the ancient Romans.

To write the numbers to thirty only three letters are used. I for 1, V for 5, and X for 10. The other numbers are expressed by repeating the letters, and the sum is the number expressed. The important thing to remember is that 4 and 9 have a special combination of letters to represent them. IV is used for 4 and IX for nine. In all other cases below 30 the letters are written in the order of their value, the largest first. X or V is written before the I. Thus 8 is written VIII, that is, $5 + 1 + 1 + 1$. $13 = XIII = 10 + 1 + 1 + 1$. $26 = XXVI = 10 + 10 + 5 + 1$.

$4 = IV = 5 - 1$ $\qquad$ $9 = IX = 10 - 1$

$14 = XIV = 10 + 4$ $\qquad$ $19 = XIX = 10 + 9$

$24 = XXIV = 10 + 10 + 4$ $\qquad$ $29 = XXIX = 10 + 10 + 9$

1. Write the numbers from 1 to 30 in Roman.

Read the following:

2. XVII.
3. VIII.
4. IV.
5. IX.
6. XIV.
7. XXVII.
8. XXX.
9. XXII.
10. XIX.
11. XII.
12. XXIV
13. XXV.
14. XVIII.
15. VI.
16. III.
17. XX.

10 cents (¢) = 1 dime.
10 dimes = 1 dollar ($).
1 dollar is written $1 or $1.00.
10 cents is written 10¢ or $.10.
1 dollar *and* 10 cents is written $1.10.

The period in $.10 (and in $1.10) is called the **decimal point.** When a number of cents is written with the sign $, there are always two figures after the decimal point. Read the word *and* between dollars and cents.

Read:

1.	2.	3.	4.
$4.00	$1.25	$4.32	$27.20
$6.00	$2.25	$7.50	$80.07
40¢	$.40	90¢	$.90
$15.00	$4.35	$1.05	$2.10
$25.00	$6.23	$16.10	$30.01
$49.00	$17.53	$17.36	$6.08
$2.52	$1.37	$2.49	$5.43
$19.12	$8.19	$3.12	$2.16
$34.96	$19.08	$5.61	$7.84

How many cents are there in a dollar?

5. *How many cents are there in*
$1.37; $2.18; $3.45; $10; $11.50; $3.45?

6. *Change to cents:*
$\frac{1}{2}$ dollar; $\frac{1}{4}$ dollar; $1\frac{1}{2}$ dollars; $3\frac{1}{4}$ dollars; $2\frac{1}{2}$ dollars.

7. *Change to dollars:*
200¢; 500¢; 282¢; 564¢; 900¢; 345¢.

Oral Practice

Add:

1. \$.25	**4.** \$.37	**7.** \$.52	**10.** \$.61	**13.** \$.48
.20	.40	.30	.40	.30
2. \$.25	**5.** \$.37	**8.** \$.52	**11.** \$.61	**14.** \$.48
.21	.41	.32	.41	.31
3. \$.25	**6.** \$.37	**9.** \$.52	**12.** \$.61	**15.** \$.48
.22	.42	.35	.44	.33

16. Add \$.65 and \$.24.

24 is (20 + 4). Say, "65, 85, 89."

17. \$.42	**20.** \$.58	**23.** \$.47	**26.** \$.66	**29.** \$2.48
.25	.32	.46	.34	.34
18. \$.32	**21.** \$.74	**24.** \$.73	**27.** \$.39	**30.** \$1.26
.26	.25	.19	.34	.66
19. \$.35	**22.** \$.55	**25.** \$.89	**28.** \$1.16	**31.** \$2.59
.48	.26	.28	.28	.23

32. Harry had 29 cents in his bank and put in 12 cents more. How many cents had he then?

33. Lucy paid \$.35 for a book and \$.24 for writing material. How much did she pay out?

34. Harry collected from his customers \$.47 on Monday, and \$.33 on Tuesday. How much did he collect in both days?

35. Tom's mother paid \$.35 for tea, \$.47 for soap. How much did both cost?

36. How much are \$.59 and \$.15? \$.64 and \$.27? \$.77 and \$.17?

Find the sums:

1. 23 and 8	**2.** 35 and 8	**3.** 28 and 6	**4.** 67 and 8
37 and 6	37 and 4	97 and 8	76 and 6
72 and 9	41 and 5	62 and 9	57 and 7
44 and 5	53 and 6	71 and 8	96 and 6
65 and 6	55 and 9	46 and 9	87 and 7
77 and 8	47 and 9	81 and 5	59 and 4
5. 44 and 8	**6.** 49 + 9	**7.** 81 + 7	**8.** 59 + 9
37 and 7	34 + 8	92 + 8	23 + 7
57 and 4	17 + 2	35 + 7	47 + 5
64 and 9	94 + 6	79 + 7	70 + 9
98 and 8	42 + 7	41 + 6	49 + 6
76 and 8	31 + 4	27 + 4	36 + 5
9. 98 + 7	**10.** 28 + 5	**11.** 2670	**12.** 3918
37 + 3	48 + 9	4187	9785
52 + 9	33 + 7	2789	4861
34 + 3	45 + 3	8857	4064
58 + 3	67 + 4	8569	1436
13. 4296	**14.** 3986	**15.** 2480	**16.** 7684
3424	6980	4626	5321
2769	7642	1594	3817
4284	3376	8423	1740
4338	6848	1932	4753
17. 4664	**18.** 3553	**19.** 4678	**20.** 1976
7825	9484	3716	1274
7538	4218	5871	3618
4181	6245	7318	8615
2408	7584	8521	8634
6426	6507	1283	8497

Find the sums:

1. 25¢ and 5¢
   37¢ and 8¢
   19¢ and 7¢
   45¢ and 6¢
   50¢ and 5¢

2. 36¢ and 4¢
   19¢ and 2¢
   15¢ and 4¢
   35¢ and 9¢
   18¢ and 6¢

3. 31¢ and 5¢
   39¢ and 6¢
   16¢ and 7¢
   14¢ and 8¢
   43¢ and 9¢

4. 26¢ and 9¢
   17¢ and 5¢
   47¢ and 6¢
   25¢ and 8¢
   27¢ and 9¢

5. 50¢ + 10¢
   67¢ + 20¢
   15¢ + 60¢
   31¢ + 40¢
   45¢ + 20¢

6. 43¢ + 30¢
   27¢ + 40¢
   17¢ + 80¢
   75¢ + 10¢
   53¢ + 20¢

7. 26¢ + 91¢
   17¢ + 15¢
   47¢ + 36¢
   14¢ + 38¢
   39¢ + 46¢

8. 27¢ + 59¢
   29¢ + 43¢
   35¢ + 28¢
   18¢ + 74¢
   53¢ + 25¢

Add:

9.	10.	11.	12.	13.	14.
35¢	27¢	36¢	37¢	31¢	81¢
14¢	18¢	24¢	18¢	26¢	17¢

15.	16.	17.	18.	19.	20.
19¢	28¢	46¢	16¢	43¢	26¢
22¢	27¢	37¢	38¢	55¢	45¢

21.	22.	23.	24.
$24.36	$19.26	$87.56	$58.29
18.24	15.17	52.19	51.27
29.35	36.47	34.47	46.98
16.21	25.94	55.29	89.17
14.91	59.27	33.46	27.59

1. Fred's ball cost 35 cents and his bat cost 50 cents. How much did both cost?

2. Ray rode his bicycle 28 miles on Monday, 31 on Tuesday, and 26 on Wednesday. How many miles did he ride during the three days?

3. Mrs. Moore bought a dozen oranges for 50 cents, 3 grapefruit for 20 cents, and one half dozen bananas for 28 cents. Find the amount of her purchase.

4. James worked 16 examples in arithmetic Monday, 12 on Tuesday, 15 on Wednesday, 19 on Thursday, and 14 on Friday. How many did he work that week?

5. George has $7.22 in his bank, Harold $5.17 in his bank, and Bertha $8.04 in her bank. How much do they all have?

6. Mr. Kelly's telephone bill for one month was $4.40, his gas bill $4.05, and his electric bill $2.35. What was the total of these three bills?

7. Elizabeth bought a book for $1.05, a tablet for 10 cents, and a pencil for 3 cents. How much did they cost?

8. Henry had 17 Holstein cows, 19 Guernseys, and 12 Jerseys. How many cows did he have?

9. Albert delivered papers as follows: 21 Standards, 17 Journals, 18 Heralds, and 9 Americans. How many papers did he deliver?

10. Sue picked 19 quarts of berries, Dan 22, and Mrs. Brown 26. How many quarts did they all pick?

11. In a Junior High School there are 174 pupils in the 7th grade, 166 in the 8th, and 149 in the 9th. How many pupils are there in the school?

[For oral dictation]

Find remainders:

1. \$.25	2. \$.25	3. \$.25	4. \$.25	5. \$.25
.08	.07	.15	.19	.12
6. \$.50	7. \$.50	8. \$.50	9. \$.50	10. \$.50
.27	.15	.34	.38	.43
11. \$.75	12. \$.75	13. \$.75	14. \$.75	15. \$.75
.26	.28	.64	.45	.35
16. \$1.00	17. \$1.00	18. \$1.00	19. \$1.00	20. \$1.00
.15	.72	.46	.45	.49
21. \$1.00	22. \$1.00	23. \$1.00	24. \$1.00	25. \$1.00
.16	.24	.35	.28	.84

26. Dale purchased a tablet for 8¢. How much change should she receive from a quarter?

27. Genevieve bought a handkerchief for 40¢, and handed the clerk a half dollar. What was her change?

28. Edith gave the bookseller a quarter and a half dollar, when she bought a 55-cent book. How much was her change?

29. Charles bought a ball for 65¢, and gave the dealer a dollar bill. How much change did he receive?

30. How much change should Evelyn receive from a half dollar for a purchase of 22¢?

31. Eugene bought a flash light for 73¢. What was the change from a dollar bill?

32. Allen bought a tablet and pencil for 12 cents. How much change would he receive from a quarter?

1. Mr. Nichols bought a dozen eggs for 50 cents and sold them for 65 cents. Did he gain or lose and how much?

65¢ *selling price*
50 *cost*
15¢ *gain*

He sold the eggs for more than he paid, therefore he gained. The *number* of cents gained is the difference between 65 and 50, which is 15. He gained 15 cents.

2. Glen bought a baseball glove for $4 and sold it for $3. Did he gain or lose and how much?

$4. *cost*
3. *selling price*
$1. *loss*

He sold the glove for less than it cost, therefore he lost. The number of dollars lost is the difference between 4 and 3, which is 1. He lost $1.

3. Mr. Harris bought a piano for $350 and sold it for $425. How much did he gain?

4. Mr. Trapp bought a car for $550 and sold it for $400. Did he gain or lose and how much?

5. Mr. Briggs bought a horse for $175 and sold it for $130. How much did he lose?

6. A coal dealer buys coal for $11 a ton and sells it for $13 a ton. How much does he gain on a ton?

7. A merchant bought flour for $160 and sold it for $190. Does he gain or lose and how much?

8. Frank bought a book for $1.65 and sold it for $1.30. How much did he lose?

9. Lewis bought a sled for $2.50 and sold it for $2. How much did he lose?

10. Robert bought newspapers for 80 cents and sold them for $1.05. How much did he gain?

11. A city lot cost $850 and was sold for $975. What was the gain?

12. Mr. Jones buys wagons for $97.50 and sells them for $120. How much does he gain?

13. Mark sold his bicycle for $18.75. He paid $25 for it. What was his loss?

14. Mary received $20 for a calf which cost her $16.23 to raise. Did she gain or lose and how much?

15. Mr. Farmer planted a field of potatoes. He paid $10 for rent of land, $32.60 for labor, and $6.30 for seed. He sold the crop for $100.70. What was his gain?

16. When Mr. Smith sold his pony for $125.00 he lost $75. What was the cost of the pony?

17. Mr. Brown sold a bushel of apples for $2.15. He gained $.65. What did the apples cost him?

18. Mr. Tucker bought a city lot for $300. The lot was sold for $288.60. What was his loss?

19. I bought a farm for $5675 and sold it for $5480. Did I gain or lose and how much?

Make and solve problems using the following facts:

20. $375.85 buying price
370.60 selling price

21. $800.00 selling price
701.75 buying price

22. A merchant buys milk at 9¢ a quart, and sells it at 12¢ a quart. How much does he gain on 5 quarts?

23. Oranges cost 78¢ a dozen, and are sold for $1.00 a dozen. What is the gain?

24. Knives that cost 98¢ in 1914, cost $1.75 in 1918. How much was the increase in cost?

25. Charles paid 70¢ for an arithmetic, $1.25 for a geography, 65¢ for an English book, and 8¢ for a writing book. What did they all cost?

Sales Slips

If a person goes to a store and buys several articles, he is given a *sales slip* by the clerk. This sales slip is a piece of paper on which is printed the name of the owner of the store and the town in which the store is located. On this slip the clerk writes the articles which he has sold and the price of each article.

A **sales slip** *is a written statement of articles sold and the price.*

1. Mrs. Rice went to the store of Ross D. Wolf in Ripley, N. Y., and bought a loaf of bread for $.12, a quart of milk for $.14, a pound of cheese for $.32, and a can of corn for $.22. This is her sales slip.

ROSS D. WOLF
Grocer
RIPLEY, N. Y.

Name Mrs. Rice

Address

SOLD BY	DATE	AM'T REC'D	
1	loaf of bread		12
1	qt. of milk		14
1	lb. of cheese		32
1	can of corn		22
			80

2. Make out a sales slip for the following goods purchased of the Sterling Shoe Store, Syracuse, N. Y., Nov. 12, 1925. One pair of overshoes at $4, one pair of shoes at $6.50, and one pair of rubbers at $1.25.

3. Make out a sales slip for one pound of butter at 50 cents, one peck of potatoes at 40 cents, one peck of apples at 45 cents, and a pound of coffee at 55 cents purchased of A. D. Buyett, grocer at Homer, N. Y., February 7, 1925.

1. Mr. John Hyde keeps a meat market. Design a sales slip for him.

2. Mr. Hyde sells to Robert Hart, who keeps a restaurant, 8 lb. sirloin steak at 45¢; 12 lb. pan sausage at 22¢; 6 lb. boiled ham at 55¢. Make out and foot the sales slip.

3. Suppose you bought from Mr. Hyde 2 lb. of liver at 18¢; 1 lb. of bacon at 35¢; 5 lb. of lard at 30¢; and a four-pound chicken at 40¢. Make out the sales slip Mr. Hyde should give you.

4. Mr. Arthur Hayes bought of Mr. Edward Hovey a mowing machine for $52; a hay-rake for $36; 5 lb. manila rope at 32¢ per pound; and 10 gal. of gasolene at 26¢. Make out the sales slip. Foot and receipt it.

5. George Fuller, hardware dealer, sold to Richard Pierce 25 lb. wire nails at 8¢; 3 hammers at $1.25; 1 carpenter's square $2.50; 4 pair (pr.) hinges at 48¢. Make, foot, and receipt the sales slip.

6. Suppose you are a grocer, and your teacher the purchaser. She buys at your store 3 lb. Rio coffee at 18¢; 2 loaves of bread at 12¢; 4 boxes strawberries at 22¢; 2 cans tomatoes at 25¢. Make, foot, and receipt the sales slip.

7. Make out a sales slip having three items which may be bought at a hardware store.

8. Make out a sales slip of dry goods with four items.

9. Make out a sales slip for $\frac{3}{4}$ yd. of lace at $4 a yard.

10. Mr. Spencer bought of Mr. Sharpe a chicken weighing $3\frac{1}{2}$ lb. He paid 40 cents a pound. Make out the sales slip.

Can you give ten products in ten seconds?

A.	*B.*	*C.*	*D.*
1×5	2×9	3×2	6×6
4×6	10×11	2×2	6×1
5×9	12×7	6×5	8×7
7×7	10×6	8×6	10×10
9×8	12×12	5×10	9×6
4×3	7×10	3×12	4×4
8×5	5×4	7×4	8×8
7×9	9×3	11×7	2×11
2×5	11×11	5×3	9×2
4×9	6×12	10×4	4×8

E.	*F.*	*G.*	*H.*
9×12	11×4	4×10	3×8
1×7	12×2	6×11	10×5
7×5	3×11	10×8	2×12
11×8	2×1	1×12	9×1
1×6	9×11	6×8	6×9
7×3	10×7	8×4	7×6
3×3	12×11	11×4	5×12
1×9	11×6	12×8	7×2
5×11	3×7	4×5	12×10
10×3	3×9	2×8	7×8

I.	*J.*	*K.*	*L.*
5×5	1×8	7×1	6×2
10×9	12×4	6×3	11×2
8×9	7×12	5×7	4×11
3×6	12×1	9×10	8×1
8×11	10×1	1×1	1×3
9×7	6×4	6×7	9×5
3×10	4×1	1×10	11×10
12×5	10×2	5×8	4×12
3×4	2×3	3×5	10×4

Factors and Product

1. $6 \times 8 = ?$
2. $6 \times ? = 48.$
3. $? \times 6 = 48.$
4. $48 \div 6 = ?$
5. $48 \div ? = 8.$
6. $? \div 6 = 8.$

We have found that the *multiplier* and *multiplicand* are **factors** of the *product*, and that the *divisor* and *quotient* are **factors** of the *dividend*.

If you have the product and one of its factors, how can you find the other factor?

If you have the dividend and one of its factors, how can you find the other factor?

In the following problems tell whether a product or a factor is to be found.

7. What will 6 tables cost at $8 each?

8. What will 8 pairs of shoes cost at $6 a pair?

9. Six boys have eight cents each. How much have they all?

10. Forty-eight soldiers march 8 abreast. There are how many ranks?

11. Six quarts of milk cost 48¢. That is how much a quart?

12. At 15¢ each what will 5 mouth organs cost?

13. My rent is $20 a month. That is how much a year?

14. I paid Mr. Smith $15 for 3 days' work with his team. That is how much a day?

A **factor** *is one of the numbers multiplied together to produce a product.*

Read quickly and supply the missing factors:

1. $3 \times ? = 30$	**7.** $? \times 6 = 42$	**13.** $? \times 2 = 38$
2. $4 \times ? = 24$	**8.** $? \times 9 = 81$	**14.** $7 \times ? = 49$
3. $? \times 5 = 20$	**9.** $9 \times ? = 45$	**15.** $? \times 12 = 48$
4. $7 \times ? = 21$	**10.** $11 \times ? = 99$	**16.** $? \times 7 = 84$
5. $? \times 3 = 27$	**11.** $10 \times ? = 40$	**17.** $4 \times ? = 96$
6. $8 \times ? = 72$	**12.** $4 \times ? = 36$	**18.** $12 \times ? = 144$

19. $? \times 11 = 121$ **20.** $? \times 19 = 76$

21. Give two factors of 6; 9; 10; 14; 15; 21; 25; 22; 33; 34; 35; 38; 39; 49; 63; 72; 81; 56; 48; 54; 36; 52; 27.

22. Of what number are 12 and 11 factors?

23. The factors are 4 and 7. Find the product.

24. 12 and 6 are factors of what number?

25. Of what number are 14 and 10 factors?

26. The factors are 7 and 6. Find the product.

27. 12 and 7 are factors of what number?

28. The factors are 12 and 9. Find the product.

29. Of what number are 3 and 8 the factors?

30. 4 and 9 are the factors of what number?

31. 2 and 7 are the factors. Find the product.

32. Of what number are 6 and 5 the factors?

1. Add each of the numbers in the outer ring to every number in the inner ring.

2. See how quickly you can add 4 to every number in the inner ring. See if you can add 5 more quickly than you did 4.

3. Which number can you add in the shortest time? Which number takes the longest time?

Subtract:

4.	813	5.	493	6.	290	7.	840	8.	237	9.	800
	633		234		164		650		156		720
10.	931	11.	815	12.	790	13.	841	14.	126	15.	371
	702		442		683		724		86		232

16. Find the difference between forty-seven thousand, eight hundred sixty-five, and twenty thousand, seven hundred sixty-eight.

17. When the minuend is 3046 and the subtrahend 898, what is the difference? Prove.

18. Ruby bought a dozen pansy plants for 25 cents. She gave the florist a silver dollar. How much change did she receive?

19. Ward wished to buy a ball glove which cost $1.25. He had 80 cents. How much more did he need?

20. Subtract twenty-three thousand, four hundred eighty-seven from forty-nine thousand, seventy-six.

1. Four dolls at $.12 each cost how much?

2. An orchard has 3 rows of trees with 8 trees in a row. How many trees are there in the orchard?

3. What does a year's rent amount to at $32 a month?

4. 12 and 10 are the factors of what number?

5. How many days are there in 8 weeks?

6. A half dollar, 2 quarters, a dime, and 2 nickels make how much money?

7. Albert has collected 110 postage stamps. Ralph has 5 times as many. How many has Ralph?

8. What must I pay for a gallon of vinegar at 6 cents a quart?

9. A lady bought 3 dozen buttons at 8 cents a dozen, and a yard of ribbon at 10 cents. What did she pay for both?

10. I buy four oranges at six cents each, how much change should I receive from a quarter?

11. Three mouse traps at 5¢ each, and a screw driver at 15¢ will cost how much?

12. Find the cost of 8 cards of buttons at 12¢ each.

13. Ten pounds of butter at 40¢ a pound will cost how much?

14. I bought 3 dozen bananas at 30¢ a dozen. What change did I get from a dollar?

15. How many inches are there in 3 ft.?

16. Don buys 5 gal. of gasoline at 20 cents a gallon. How much change does he receive from a ten-dollar bill?

$$\begin{array}{r} \$23.64 \\ 7 \\ \hline \$165.48 \end{array}$$

Notice that there are *two* figures after the decimal point in the *product*, the same as in the multiplicand.

Multiply:

1. \$1.15 by 8.	**11.** \$54.05 by 6.	**21.** \$1.82 by 16.
2. \$1.21 by 6.	**12.** \$63.22 by 4.	**22.** \$3.86 by 22.
3. \$6.56 by 4.	**13.** \$72.82 by 5.	**23.** \$5.90 by 35.
4. \$7.87 by 2.	**14.** \$82.88 by 6.	**24.** \$6.90 by 50.
5. \$9.89 by 3.	**15.** \$94.41 by 7.	**25.** \$47.94 by 30.
6. \$8.18 by 7.	**16.** \$3.66 by 12.	**26.** \$50.55 by 100.
7. \$4.96 by 5.	**17.** \$12.55 by 9.	**27.** \$57.12 by 200.
8. \$8.40 by 9.	**18.** \$24.68 by 7.	**28.** \$95.31 by 250.
9. \$2.70 by 6.	**19.** \$33.18 by 5.	**29.** \$33.60 by 500.
10. \$3.68 by 10.	**20.** \$41.62 by 4.	**30.** \$63.84 by 823.

346 primers at 35¢ each will cost how much?

$$\begin{array}{r} \$.35 \\ 346 \\ \hline 210 \\ 140 \\ 105 \\ \hline \$121.10 \end{array} \qquad \begin{array}{r} 346 \\ \$.35 \\ \hline 1730 \\ 1038 \\ \hline \$121.10 \end{array}$$

It is more convenient to use the smaller factor as the multiplier. This is permissible because the *number* sought is the *numerical* product of 346 and .35.

Multiply:

31. \$.52 by 145.	**35.** \$6.43 by 400.
32. \$.38 by 275.	**36.** \$7.39 by 324.
33. \$.75 by 1283.	**37.** \$24.35 by 96.
34. \$.42 by 25.	**38.** \$63.90 by 660.

Find the cost of

1. 9 sacks of flour at $2.05 each.
2. 12 quarts of milk at 14¢ a quart.
3. 125 bars of soap at 7¢ a bar.
4. 35 bushels of potatoes at $.65 a bushel.
5. 24 cans of corn at $.25 a can.
6. 60 lb. of sugar at 8¢ a pound.
7. 18 pounds of coffee at 55¢ a pound.

Find the cost of

8. 11 pairs of shoes at $6.50 a pair.
9. 14 boxes of Shinola at 10¢ a box.
10. 20 pairs of rubbers at $1.25 a pair.
11. 45 pairs of shoestrings at 15 cents a pair.
12. 9 pairs of overshoes at $3.75 a pair.
13. 12 pairs of stockings at $1.50 a pair.
14. 18 pairs of slippers at $2 a pair.

Find the cost of

15. 15 yards of cloth at $1.20 a yard.
16. 10 pairs of curtains at $2.45 a pair.
17. 32 square yards of linoleum at $1.25 a square yard.
18. 20 yards of oilcloth at 25 cents a yard.
19. 24 window screens at $.85 each.
20. 28 curtain rods at $.45 each.
21. 36 collars at 20 cents each.

208	446	240
45	304	40
1040	1784	9600
832	1338	
9360	135584	

Find the products:

1. 107×32	**13.** 664×201	**25.** 240×40
2. 705×11	**14.** 586×304	**26.** 320×68
3. 209×14	**15.** 711×508	**27.** 610×19
4. 806×43	**16.** 267×803	**28.** 390×43
5. 904×24	**17.** 887×604	**29.** 230×52
6. 308×52	**18.** 617×109	**30.** 760×67
7. 401×27	**19.** 729×805	**31.** 880×46
8. 602×34	**20.** 393×309	**32.** 550×23
9. 503×25	**21.** 927×608	**33.** 190×69
10. 607×17	**22.** 598×704	**34.** 610×54
11. 909×67	**23.** 235×405	**35.** 950×70
12. 706×29	**24.** 762×403	**36.** 670×65

37. What will 208 uniforms cost at \$45 each?

38. How much will 60 bushels of potatoes cost at \$.75 a bushel?

39. How much is 67 multiplied by 110?

40. When the multiplicand is 75 and the multiplier 80, what is the product?

41. One baseball costs \$1.50. What will 18 balls cost?

Find the sums. Time yourself:

1.	2.	3.	4.	5.
76305	81278	46158	52370	54351
48362	46197	25346	73125	28687
61049	21938	56764	21388	57318
64244	24682	67410	20736	41764
23765	52880	34256	35824	35743

Add and prove:

6. $9+4+5+6+4=?$
$4+6+5+4+9=?$
$9+4+6+5+4=?$
$5+6+4+5+9=?$
$4+6+4+9+5=?$
$?+?+?+?+?=?$

7. $3+7+8+2+1=?$
$1+2+3+7+8=?$
$8+7+3+2+1=?$
$2+7+3+8+8=?$
$2+8+7+8+3=?$
$?+?+?+?+?=?$

Find remainders and prove:

8.	10.	12.	14.
1296	4381	981	7120
473	2073	973	500

9.	11.	13.	15.
2013	408	607	370
1005	231	583	219

Find products:

16. 838×242.	20. 763×581.	24. 325×716.
17. 791×635.	21. 298×761.	25. 976×308.
18. 829×935.	22. 435×600.	26. 952×449.
19. 910×900.	23. 29×900.	27. 613×808.

28. A magazine has 288 pages in each number. How many pages are there in 12 numbers?

29. The factors of a number are 24 and 85. What is the number?

$\begin{array}{r}4\\3\overline{)12}\end{array}$	$12 \div 3 = 4$	$\frac{12}{3} = 4$	$\frac{1}{3}$ of $12 = 4$

1. $3\overline{)24}$	6. $2\overline{)16}$	11. $8\overline{)64}$	16. $9\overline{)54}$
2. $6\overline{)36}$	7. $4\overline{)28}$	12. $5\overline{)35}$	17. $7\overline{)63}$
3. $5\overline{)25}$	8. $9\overline{)72}$	13. $3\overline{)21}$	18. $4\overline{)32}$
4. $8\overline{)56}$	9. $6\overline{)54}$	14. $4\overline{)32}$	19. $3\overline{)33}$
5. $7\overline{)42}$	10. $2\overline{)18}$	15. $7\overline{)49}$	20. $6\overline{)48}$

21. $9 \div 9 = ?$	27. $81 \div 9 = ?$	33. $84 \div 7 = ?$
22. $9 \div 3 = ?$	28. $24 \div 4 = ?$	34. $66 \div 6 = ?$
23. $18 \div 6 = ?$	29. $27 \div 3 = ?$	35. $20 \div 4 = ?$
24. $28 \div 7 = ?$	30. $14 \div 2 = ?$	36. $27 \div 3 = ?$
25. $36 \div 4 = ?$	31. $36 \div 9 = ?$	37. $7 \div 7 = ?$
26. $88 \div 8 = ?$	32. $35 \div 5 = ?$	38. $21 \div 3 = ?$

39. $45 \div 5 = ?$ 40. $96 \div 8 = ?$

41. $\frac{27}{3} = ?$	46. $\frac{32}{4} = ?$	51. $\frac{16}{2} = ?$	56. $\frac{21}{3} = ?$
42. $\frac{40}{8} = ?$	47. $\frac{48}{8} = ?$	52. $\frac{36}{6} = ?$	57. $\frac{28}{4} = ?$
43. $\frac{54}{6} = ?$	48. $\frac{32}{8} = ?$	53. $\frac{54}{9} = ?$	58. $\frac{42}{6} = ?$
44. $\frac{63}{7} = ?$	49. $\frac{49}{7} = ?$	54. $\frac{96}{8} = ?$	59. $\frac{44}{4} = ?$
45. $\frac{15}{3} = ?$	50. $\frac{24}{4} = ?$	55. $\frac{27}{9} = ?$	60. $\frac{81}{9} = ?$

61. $\frac{1}{7}$ of 28 is ?	66. $\frac{1}{2}$ of 12 is ?	71. $\frac{1}{7}$ of 84 is ?
62. $\frac{1}{4}$ of 48 is ?	67. $\frac{1}{9}$ of 63 is ?	72. $\frac{1}{9}$ of 81 is ?
63. $\frac{1}{3}$ of 27 is ?	68. $\frac{1}{6}$ of 30 is ?	73. $\frac{1}{8}$ of 56 is ?
64. $\frac{1}{5}$ of 55 is ?	69. $\frac{1}{5}$ of 20 is ?	74. $\frac{1}{6}$ of 36 is ?
65. $\frac{1}{8}$ of 48 is ?	70. $\frac{1}{3}$ of 24 is ?	75. $\frac{1}{7}$ of 63 is ?

Divisibility of Numbers

A number that has no fractional part is a **whole number**, or **integer.**

An integer which divides a number without a remainder is an **exact divisor** of that number.

A number that can be exactly divided by **2** is an **even number**; as, 2, 4, 6, 8, 10.

A number that cannot be exactly divided by **2** is an **odd number**; as, 1, 3, 5, 7, 9, 11.

An even number always ends in 0, 2, 4, 6, or 8.
An odd number always ends in 1, 3, 5, 7, or 9.

Tell which of the following are even:

26	37	19	49	13	38	210	11	78
32	180	29	12	29	130	162	87	64

If the sum of the digits in a number is exactly divisible by 3, *the number is divisible by* 3.

$1 + 2 + 6 = 9$. 9 is divisible by 3.

Therefore 126, 621, 216, etc. are divisible by 3.

If the sum of the digits in a number is exactly divisible by 9, *the number is divisible by* 9.

Is 283 divisible by 9?

Tell which of the following are divisible by 3; *by* 9. *Test:*

384	543	968	723	175	24111
261	279	684	993	225	27117

If a number ends in **0** or **5**, it is exactly divisible by **5.**

If a number ends in **0**, it is exactly divisible by **10.**

Tell which of these numbers are divisible by 5; *by* 10:

15	60	175	225	322	800	805
28	75	180	231	725	840	997

A **factor** *is one of the numbers multiplied together to produce a product.*

Give two factors of each of the following:

6	12	21	33	26	40	45	50	80
9	15	24	30	36	42	49	63	81

A **prime number** *is an integer that has no factors except itself and* 1: as 1, 2, 3, 5, 7, 17, 19.

Do you know these prime numbers?

1 2 3 5 7 11 13 17 19 23

Why are the above numbers *prime numbers?*

A factor that is a prime number is a **prime factor.** 5 and 3 are prime factors of 30.

Find the prime factors of:

4	8	15	21	16	30	40	60	75
6	10	12	22	18	28	36	63	26

Which of the following are prime? Why?

3, 4, 5, 6, 23, 24, 27, 29, 30, 31, 39, 41.

Tell which of the numbers from 1 to 100 are divisible by 2; by 3; by 9; by 5; by 10.

4 *Quotient*
6)26 2 *Remainder* $26 \div 6 = 4$ and 2 *remainder*

Test $6 \times 4 + 2 = 26$
Divisor × Quotient + Remainder = Dividend

Divide and test:

1. $4\overline{)27}$	6. $3\overline{)31}$	11. $8\overline{)49}$	16. $5\overline{)36}$
2. $6\overline{)35}$	7. $12\overline{)81}$	12. $7\overline{)39}$	17. $9\overline{)57}$
3. $9\overline{)28}$	8. $10\overline{)76}$	13. $4\overline{)25}$	18. $8\overline{)61}$
4. $5\overline{)43}$	9. $11\overline{)69}$	14. $6\overline{)50}$	19. $12\overline{)77}$
5. $7\overline{)62}$	10. $2\overline{)17}$	15. $11\overline{)53}$	20. $10\overline{)38}$

21. $72 \div 7 = ?$	26. $45 \div 8 = ?$	31. $29 \div 3 = ?$
22. $61 \div 9 = ?$	27. $23 \div 6 = ?$	32. $17 \div 4 = ?$
23. $42 \div 5 = ?$	28. $19 \div 2 = ?$	33. $37 \div 5 = ?$
24. $81 \div 11 = ?$	29. $77 \div 12 = ?$	34. $41 \div 6 = ?$
25. $76 \div 12 = ?$	30. $62 \div 5 = ?$	35. $59 \div 9 = ?$

36. $\frac{64}{6} = ?$	39. $\frac{36}{8} = ?$	42. $\frac{73}{7} = ?$
37. $\frac{71}{12} = ?$	40. $\frac{41}{7} = ?$	43. $\frac{39}{4} = ?$
38. $\frac{36}{5} = ?$	41. $\frac{46}{9} = ?$	44. $\frac{31}{8} = ?$

45. *Divide each of the following by* 6 *and test as above:*
11, 19, 47, 39, 63, 56, 71, 69, 23, 27, 38.

46. *Divide each of the following by* 7 *and test as above:*
19, 17, 31, 29, 43, 57, 75, 24, 18, 64.

47. *Divide each of the following by* 9 *and test as above:*
93, 17, 89, 32, 44, 85, 76, 21, 64, 53, 79, 56, 82, 74.

1. *Divide each of the following by 4:*

12	24	16	28	44	48	36	32	20	40
18	27	33	42	35	38	41	17	15	7

2. *Divide each of the following by 6:*

24	48	30	18	36	72	66	54	42	12
21	33	23	45	50	68	64	19	28	41

3. *Divide each of the following by 7:*

14	70	28	63	21	35	84	77	42	56
54	72	68	23	31	52	74	81	46	25

4. *Divide each of the following by 8:*

16	96	32	80	24	88	40	56	48	64
91	63	28	84	54	50	68	17	33	47

5. *Divide each of the following by 9:*

81	63	45	36	72	90	108	18	54	27
16	34	35	76	29	98	85	57	42	74

Divide:

6. $4\overline{)21}$	12. $4\overline{)37}$	18. $9\overline{)91}$	24. $7\overline{)80}$
7. $7\overline{)36}$	13. $9\overline{)99}$	19. $7\overline{)75}$	25. $8\overline{)71}$
8. $9\overline{)17}$	14. $7\overline{)34}$	20. $6\overline{)63}$	26. $6\overline{)29}$
9. $7\overline{)49}$	15. $7\overline{)48}$	21. $8\overline{)72}$	27. $4\overline{)19}$
10. $6\overline{)60}$	16. $8\overline{)53}$	22. $4\overline{)47}$	28. $9\overline{)73}$
11. $8\overline{)92}$	17. $6\overline{)76}$	23. $9\overline{)32}$	29. $8\overline{)57}$

30. $34 \div 6$	34. $11 \div 4$	38. $29 \div 7$
31. $41 \div 8$	35. $73 \div 8$	39. $67 \div 8$
32. $37 \div 7$	36. $50 \div 7$	40. $82 \div 9$
33. $43 \div 9$	37. $100 \div 9$	41. $76 \div 7$

440 *Quotient*	440
6)2645 5 *Remainder*	6
	2640
	5
	2645

Test 440 × 6 + 5 = 2645

Quotient × Divisor + Remainder = Dividend

Find the quotient and test:

1. 4)267	**7.** 6)2645	**13.** 8)8917	**19.** 6)2827
2. 7)818	**8.** 9)1829	**14.** 6)4621	**20.** 7)4762
3. 5)962	**9.** 8)9826	**15.** 7)1522	**21.** 4)1726
4. 9)897	**10.** 4)2857	**16.** 9)3552	**22.** 9)6289
5. 8)321	**11.** 5)2723	**17.** 4)2745	**23.** 8)2984
6. 7)629	**12.** 7)6429	**18.** 5)8627	**24.** 7)6921

Divide and test:

25. 87624 ÷ 5	**30.** 52678 ÷ 8	**35.** 26740 ÷ 6
26. 22986 ÷ 7	**31.** 62897 ÷ 5	**36.** 12905 ÷ 5
27. 42675 ÷ 8	**32.** 48269 ÷ 7	**37.** 32896 ÷ 4
28. 19267 ÷ 9	**33.** 18624 ÷ 4	**38.** 72986 ÷ 6
29. 29642 ÷ 4	**34.** 72896 ÷ 8	**39.** 27981 ÷ 9

40. The dividend is 65,240 and 4 is the divisor. Find the quotient.

41. The divisor is 5 and the dividend is 9080. Find the quotient.

42. The dividend is 24,863 and 9 is the divisor. Find the quotient.

1. There are 3 feet in a yard. How many yards are there in 102 feet?

The *number* of yards is the quotient of 102 divided by 3, which is ——. There are —— yards.

2. The step of an ostrich measures 5 feet. How many steps will an ostrich take in going 225 feet?

3. What will one book cost, when 7 books cost $14?

The *number* of dollars one book will cost is the quotient of 14 divided by 7, which is ——. One book will cost —— dollars.

4. Find the cost of one hat when 9 hats cost $27.

5. A man walks 24 miles in 8 hours. How far does he walk in one hour?

6. How many bags, holding 5 pounds each, are needed for 360 pounds of sugar?

7. Find the cost of one lot when 4 lots cost $1620.

8. At $8 a ton, how many tons of coal can be bought for $240?

9. If 9 children can sit on a bench, how many benches are needed for 360 children?

10. If John earns $476 in 7 months, what does he earn in a month?

11. How many autos, each carrying 5 people, are needed to take 105 people for a ride?

12. There are 5 days in a school week. Frank was in school 165 school days without being absent. How many weeks was he in school?

13. How many lambs at $9 each can be bought for 261 dollars?

14. Dividend 546, divisor 8; find the quotient.

Divide 360 by 40.

$360 \div 10 = 36$ $40 \div 10 = 4$ $36 \div 4 = 9$	Divide by 10, then by 4. Dividing 360 by 40 is the same as dividing 36 by 4.	$40\overline{)360}$ 9 $4\overline{)36}$ 9

Oral:

Find quotients:

1. $160 \div 20$	**7.** $480 \div 60$	**13.** $630 \div 70$
2. $140 \div 70$	**8.** $270 \div 30$	**14.** $480 \div 80$
3. $120 \div 40$	**9.** $320 \div 40$	**15.** $360 \div 60$
4. $180 \div 90$	**10.** $560 \div 80$	**16.** $810 \div 90$
5. $280 \div 40$	**11.** $540 \div 60$	**17.** $240 \div 30$
6. $630 \div 90$	**12.** $560 \div 70$	**18.** $720 \div 80$

19. If a jobber can buy typewriters at $60 each, how many can he buy for $420?

20. If a clerk earns $90 in 30 days how much does he earn in a day?

21. Sixty pounds make a bushel of wheat. How many bushels are there in 540 pounds of wheat?

22. $20\overline{)120}$	**26.** $80\overline{)160}$	**30.** $90\overline{)270}$	**34.** $40\overline{)240}$
23. $40\overline{)200}$	**27.** $30\overline{)120}$	**31.** $30\overline{)150}$	**35.** $60\overline{)300}$
24. $30\overline{)180}$	**28.** $70\overline{)210}$	**32.** $70\overline{)490}$	**36.** $70\overline{)420}$
25. $60\overline{)240}$	**29.** $50\overline{)250}$	**33.** $80\overline{)160}$	**37.** $20\overline{)140}$

How many times is 21 contained in 63?

3	Say "21 in 63 *three* times."
21)63	Write 3 in the quotient *directly above* 3.
	Say "3 times 21 are 63."
63	Write the product under 63.

Test $3 \times 21 = 63$

Quotient $\times$ Divisor = Dividend

Find quotients and test:

1. $21\overline{)42}$	6. $31\overline{)62}$	11. $41\overline{)123}$	16. $51\overline{)204}$
2. $21\overline{)126}$	7. $31\overline{)217}$	12. $41\overline{)287}$	17. $51\overline{)357}$
3. $21\overline{)105}$	8. $31\overline{)155}$	13. $41\overline{)82}$	18. $51\overline{)153}$
4. $21\overline{)189}$	9. $31\overline{)248}$	14. $41\overline{)328}$	19. $51\overline{)306}$
5. $21\overline{)126}$	10. $31\overline{)124}$	15. $41\overline{)164}$	20. $51\overline{)408}$

Divide and prove:

21. $244 \div 61$	28. $427 \div 61$	35. $546 \div 91$
22. $549 \div 61$	29. $405 \div 81$	36. $459 \div 51$
23. $305 \div 61$	30. $426 \div 71$	37. $213 \div 71$
24. $284 \div 71$	31. $366 \div 61$	38. $142 \div 71$
25. $243 \div 81$	32. $355 \div 71$	39. $162 \div 81$
26. $102 \div 51$	33. $497 \div 71$	40. $637 \div 91$
27. $255 \div 51$	34. $568 \div 71$	41. $182 \div 91$

Find quotients and prove:

42. $31\overline{)217}$	45. $369 \div 41$	48. $31\overline{)186}$
43. $41\overline{)287}$	46. $248 \div 31$	49. $61\overline{)183}$
44. $324 \div 81$	47. $61\overline{)488}$	50. $122 \div 61$

1. On Flag Day, 483 flags were given out in the 21 rooms of Brighton school. That was how many flags for each room?

23	Say "21 in 48 *twice*," writing 2 *directly above* 8.
21)483	Say "2 times 21 are 42," writing 42 under 48.
42	Subtract 42 from 48, writing 6.
63	Bring down the next figure 3.
63	Say "21 in 63 *three* times," writing 3 in the quotient.
	Say "3 times 21 are 63," writing 63 under 63.
	Subtract. No remainder.
	Steps: 1, Divide. 2, Multiply. 3, Subtract and compare. 4, Bring down. 5, Divide again.

Divide by 21 *and test:*

2. 504	**3.** 735	**4.** 882	**5.** 966	**6.** 924
7. 693	**8.** 987	**9.** 525	**10.** 399	**11.** 714
12. 609	**13.** 672	**14.** 378	**15.** 861	**16.** 777
17. 945	**18.** 903	**19.** 819	**20.** 798	**21.** 756

Divide by 31:

22. 868	**23.** 992	**24.** 682	**25.** 806	**26.** 713
27. 589	**28.** 527	**29.** 899	**30.** 837	**31.** 775
32. 744	**33.** 496	**34.** 372	**35.** 465	**36.** 434

Divide by 41:

37. 984	**38.** 861	**39.** 943	**40.** 902	**41.** 779
42. 615	**43.** 697	**44.** 574	**45.** 738	**46.** 533
47. 656	**48.** 492	**49.** 820	**50.** 1476	**51.** 1353
52. 451	**53.** 1394	**54.** 1025	**55.** 1271	**56.** 1681

Divide 75 by 21.

$$\begin{array}{r} 3 \\ 21\overline{)75} \\ 63 \\ \hline 12 \end{array}$$

Say "21 in 75 *three* times," writing 3 in the quotient.
Say "3 times 21 are 63," writing 63 under 75.
Subtract 63 from 75, writing 12.
The *remainder* is 12. It is less than the divisor.

Find the quotients and remainders:

1. $21\overline{)79}$	**5.** $31\overline{)95}$	**9.** $41\overline{)235}$	**13.** $51\overline{)364}$
2. $21\overline{)98}$	**6.** $31\overline{)89}$	**10.** $41\overline{)130}$	**14.** $51\overline{)214}$
3. $22\overline{)139}$	**7.** $32\overline{)172}$	**11.** $42\overline{)294}$	**15.** $52\overline{)436}$
4. $22\overline{)194}$	**8.** $32\overline{)267}$	**12.** $42\overline{)186}$	**16.** $52\overline{)184}$

Divide:

17. $130 \div 21$	**23.** $176 \div 22$	**29.** $152 \div 21$
18. $329 \div 41$	**24.** $162 \div 52$	**30.** $264 \div 32$
19. $288 \div 71$	**25.** $290 \div 72$	**31.** $348 \div 41$
20. $280 \div 31$	**26.** $196 \div 32$	**32.** $134 \div 22$
21. $269 \div 51$	**27.** $320 \div 52$	**33.** $384 \div 41$
22. $360 \div 81$	**28.** $765 \div 82$	**34.** $262 \div 42$

35. At the rate of 42 miles per hour, how many hours will it take a train to go 1428 miles?

36. How many pieces of rope each 82 feet long may be cut from a piece 738 feet long?

37. If 416 boys are divided into camps of 52 boys each, how many camps are there?

38. Mr. Fox sold 32 used typewriters for $480. They averaged how much apiece?

Divide 669 by 21.

$$\begin{array}{r} 31 \text{ } \textit{Quotient} \\ 21\overline{)669} \\ \underline{63} \\ 39 \\ \underline{21} \\ 18 \text{ } \textit{Remainder} \end{array}$$

Steps. 1, Divide.
2, Multiply.
3, Subtract and compare.
4, Bring down next figure.
5, Divide again.

Test $31 \times 21 + 18 = 669$
Quotient × Divisor + Remainder = Dividend

Find the quotients and remainders. Test:

1. $65 \div 21$	9. $99 \div 31$	17. $88 \div 40$
2. $185 \div 61$	10. $220 \div 71$	18. $230 \div 50$
3. $311 \div 61$	11. $88 \div 41$	19. $170 \div 41$
4. $155 \div 30$	12. $168 \div 81$	20. $49 \div 21$
5. $110 \div 21$	13. $135 \div 61$	21. $130 \div 41$
6. $69 \div 31$	14. $190 \div 30$	22. $189 \div 91$
7. $129 \div 21$	15. $180 \div 71$	23. $250 \div 81$
8. $290 \div 71$	16. $126 \div 31$	24. $159 \div 50$

Divide and test:

25. 280 by 21	33. 375 by 61	41. 876 by 21
26. 111 by 31	34. 250 by 81	42. 213 by 41
27. 440 by 41	35. 278 by 21	43. 867 by 51
28. 592 by 41	36. 400 by 71	44. 336 by 41
29. 260 by 21	37. 411 by 81	45. 986 by 31
30. 550 by 31	38. 884 by 41	46. 495 by 61
31. 430 by 61	39. 380 by 51	47. 195 by 21
32. 256 by 31	40. 316 by 51	48. 973 by 41

Divide 384 by 23.

16 *Quotient*
23)384
23
154
138
16 *Remainder*

Steps. 1, Divide.
2, Multiply.
3, Subtract and compare.
4, Bring down next figure.
5, Compare.

Test 16 × 23 + 16 = 384
Quotient × Divisor + Remainder = Dividend

Find the quotients and remainders:

1. 23)72	5. 34)114	9. 54)153	13. 43)264
2. 23)142	6. 34)198	10. 54)108	14. 43)204
3. 23)176	7. 34)304	11. 54)248	15. 43)184
4. 23)124	8. 34)142	12. 54)388	16. 43)314

Divide and test:

17. 9346 ÷ 23	21. 3076 ÷ 43	25. 2786 ÷ 63
18. 8678 ÷ 34	22. 1750 ÷ 24	26. 2724 ÷ 44
19. 4276 ÷ 43	23. 2555 ÷ 35	27. 1170 ÷ 45
20. 9874 ÷ 54	24. 3872 ÷ 54	28. 4352 ÷ 64

29. There are 33 pupils in each home room in our school. There are 396 pupils in the school. How many home rooms are there?

30. If 24,320 paper bottles are put up in 64 cases, how many bottles are there in each case?

31. The dividend is 18,750 and the divisor 73. What is the quotient?

32. How is an example in division proved?

I. *Add and test by adding in a different order. Can you finish in five minutes?*

1.	2.	3.	4.
4264	8660	986	9246
732	2148	6084	680
1684	345	287	2406
205	7876	48	975
6248	924	7826	8764

Subtract:

5.	6.	7.	8.
98	646	9846	48656
29	268	1078	16278

Divide and test your work by multiplication:

9. $8469 \div 7$
10. $15368 \div 4$
11. $2765 \div 5$
12. $56440 \div 8$
13. $27807 \div 31$
14. $39216 \div 43$
15. $42834 \div 22$
16. $11590 \div 20$

17. What is the difference between 4325 and 8113?

18. The subtrahend is 4864, the minuend is 8762. Find the remainder.

19. The dividend is 78,640, the divisor is 20. Find the quotient.

20. The multiplicand is 7284, the multiplier is 7. What is the product?

21. Which of the following numbers are prime?

1 2 3 4 5 6 7 8 9 10 11 12

22. Give the prime factors of:

22 25 30 48 60 64

23. How may an example in subtraction be proved?

1. If an automobile travels 19 miles on a gallon of gasoline, how many gallons will be used in driving 9044 miles?

```
  476
19)9044
   76
   144
   133
    114
    114
```

19 is almost 20. Think how many 2's in 9. To find the next quotient figure, think how many 2's in 14. To find the next quotient figure, think how many 2's in 11. 5 is a little too small, because it gives a remainder 19, the same as the divisor. What is the correct figure?

2. Divide 12,499 by 29. (29 is almost 30. Let 3 be your *guide figure* and think how many 3's in 12.)

3. Divide 2808 by 39. (39 is almost 40. What will you take for a guide figure, or trial divisor?)

4. $1,638 ÷ 39	11. 4,539 ÷ 89	18. 14,732 ÷ 58
5. $24,708 ÷ 29	12. 2,772 ÷ 99	19. 4,420 ÷ 68
6. $11,837 ÷ 19	13. 792 ÷ 18	20. 6,318 ÷ 78
7. $4,508 ÷ 49	14. 10,584 ÷ 28	21. 45,056 ÷ 88
8. $36,639 ÷ 59	15. 10,353 ÷ 29	22. 6,174 ÷ 98
9. $16,008 ÷ 69	16. 2,242 ÷ 38	23. 3,315 ÷ 39
10. $64,148 ÷ 79	17. 8,064 ÷ 48	24. 3,822 ÷ 49

25. A train of 19 sleeping cars is 1368 feet long. How long is each car?

26. How many coal cars 31 ft. long would make a train 1395 ft. long?

27. The dividend is 8084 and the divisor is 88. Find the quotient and prove.

$48384 \div 36 = 1344$

Notice that the 12 which is found by subtracting 36 from 48 is less than the divisor 36. What do you notice about the differences 15 and 14?

$$
\begin{array}{r}
1344 \\
36\overline{)48384} \\
36 \\
\hline
123 \\
108 \\
\hline
158 \\
144 \\
\hline
144 \\
144 \\
\hline
\end{array}
$$

Find quotients and test:

1. $37\overline{)134}$	5. $42\overline{)331}$	9. $43\overline{)1728}$	13. $27\overline{)1629}$
2. $46\overline{)253}$	6. $14\overline{)2267}$	10. $59\overline{)4761}$	14. $54\overline{)2691}$
3. $63\overline{)312}$	7. $49\overline{)1318}$	11. $68\overline{)4429}$	15. $82\overline{)721}$
4. $47\overline{)296}$	8. $13\overline{)2617}$	12. $19\overline{)216}$	16. $16\overline{)659}$

Divide and test:

17. 29,627 by 47	22. 31,158 by 54	27. 21,268 by 57
18. 51,620 by 15	23. 19,246 by 16	28. 33,292 by 17
19. 36,095 by 53	24. 44,562 by 79	29. 23,457 by 29
20. 23,814 by 37	25. 25,061 by 13	30. 33,161 by 14
21. 32,958 by 14	26. 22,817 by 39	31. 18,237 by 27

Find quotients and test:

32. $67\overline{)38194}$	36. $17227 \div 48$	40. $57289 \div 14$
33. $45\overline{)21167}$	37. $21173 \div 17$	41. $25068 \div 32$
34. $58\overline{)44276}$	38. $34291 \div 19$	42. $49217 \div 59$
35. $34\overline{)19152}$	39. $37142 \div 47$	43. $13826 \div 24$

1. Mr. McHenry paid $37,500 for 300 acres of land. How much did he pay for one acre?

$$\begin{array}{r} \$125 \\ 3\text{ø}\text{ø})\overline{\$375\text{ø}\text{ø}} \end{array}$$

$300 = 3 \times 100$.
We divide by 100, then by 3.
How do we divide by 100?

2.	1,500 ÷ 300.	15.	14,400 ÷ 600.	28.	4,200 ÷ 70.
3.	1,500 ÷ 500.	16.	37,100 ÷ 700.	29.	3,600 ÷ 60.
4.	4,500 ÷ 300.	17.	60,900 ÷ 700.	30.	5,400 ÷ 90.
5.	4,500 ÷ 500.	18.	77,600 ÷ 800.	31.	5,600 ÷ 700.
6.	7,500 ÷ 500.	19.	17,400 ÷ 600.	32.	1,200 ÷ 300.
7.	11,200 ÷ 700.	20.	4,050 ÷ 90.	33.	490 ÷ 70.
8.	72,000 ÷ 600.	21.	6,000 ÷ 80.	34.	34,600 ÷ 40.
9.	84,000 ÷ 700.	22.	75,600 ÷ 90.	35.	27,900 ÷ 90.
10.	37,800 ÷ 900.	23.	3,010 ÷ 70.	36.	6,420 ÷ 60.
11.	44,100 ÷ 900.	24.	31,200 ÷ 80.	37.	4,800 ÷ 80.
12.	87,600 ÷ 300.	25.	6,300 ÷ 700.	38.	62,500 ÷ 500.
13.	1,800 ÷ 900.	26.	3,240 ÷ 60.	39.	91,000 ÷ 700.
14.	23,400 ÷ 300.	27.	75,600 ÷ 900.	40.	34,000 ÷ 2000.

41. At $300 apiece, how many army horses can be bought for $20,700?

42. Our city blocks are 400 feet long. When we have walked down the street 5200 feet, how many blocks have we walked?

43. How many parachutes for aviators can be bought for $39,600 if the cost is $400 each?

1. Here are two drawings. One of them shows a unit. The other shows the unit divided into two equal parts. These parts are called halves. Each part is called one half. One half is written $\frac{1}{2}$.

2. Can you fold a sheet of paper so that the crease will divide it into two equal parts? The whole sheet of paper is a unit. What is each of the parts called?

3. Name another unit which you can divide into two equal parts. What will each part be called?

4. Suppose you divide an orange worth 6 cents into two equal parts. What would each half be worth?

A UNIT TWO HALVES

5. One half of ten cents is how many cents?

6. One half of a dozen eggs will be how many eggs?

7. What is $\frac{1}{2}$ of \$50? $\frac{1}{2}$ of 36 in.?

8. There are 16 oz. in a pound. How many ounces are there in half a pound?

9. Half a dollar is how many cents?

10. At 40 cents a pound what is half a pound of candy worth?

11. Half a foot is how many inches?

12. Half an hour is how many minutes?

13. Four half dollars are how many dollars?

14. One half and one half make how many halves?

15. One half and one half make how many units?

16. How many halves are there in two units?

17. *Add*

1 half
1 half
1 half
1 half
1 half
1 half

18. *Add*

$\frac{1}{2}$
$\frac{1}{2}$
$\frac{1}{2}$
$\frac{1}{2}$
$\frac{1}{2}$
$\frac{1}{2}$

19. $\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2}$ = how many halves?

20. Six halves is equal to how many units?

21. $\frac{3}{2} + \frac{5}{2}$ = how many halves? How many units?

22. Five halves and five halves are how many halves? How many units?

23. $\frac{5}{2} + \frac{3}{2} + \frac{4}{2} + \frac{2}{2} + \frac{1}{2} = ?$

24. $1\frac{1}{2} + 1 = ?$ $1\frac{1}{2} + 1\frac{1}{2} = ?$

25. Subtract

$3\frac{1}{2}$
$1\frac{1}{2}$

26. From $5\frac{1}{2}$ subtract $2\frac{1}{2}$.

27. Subtract $8\frac{1}{2}$ from $9\frac{1}{2}$.

1. When a unit is divided into four equal parts, what is each part called?

2. How many fourths are there in a unit?

3. Fold a sheet of paper so that the creases will divide it into four equal parts.

4. A fourth is sometimes called a quarter. How many quarters are there in a unit?

5. A quarter of a dollar is how many cents?

6. A quarter of a yard is how many inches?

7. One half equals how many fourths?

8. How many fourths are there in two units? In three units?

A UNIT 4 FOURTHS

9. One fourth of 12 inches is how many inches?

10. At 40¢ a pound what will $\frac{1}{4}$ lb. of figs cost?

11. A pound is 16 oz. How many ounces are there in $\frac{1}{4}$ lb.?

12. One fourth of 20 cents is how many cents?

13. How many minutes are there in $\frac{1}{4}$ of an hour?

14. What is $\frac{1}{4}$ of \$24?
15. $\frac{5}{4} + \frac{7}{4}$ = how many fourths? How many units?
16. $\frac{5}{4}$ is how much more than a unit?
17. $\frac{1}{4}$ is how much less than a unit?
18. $\frac{4}{4}$ = how many halves?

19. *Add* 1 fourth
1 fourth
1 fourth.

20. *Add* $\frac{1}{4}$
$\frac{1}{4}$
$\frac{1}{4}$

21. $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} = ?$
22. $\frac{1}{4} + \frac{1}{4}$ = how many halves?
23. $\frac{1}{2} + \frac{1}{4}$ = how many fourths?
24. $\frac{3}{4} + \frac{2}{4} + \frac{1}{4} + \frac{3}{4}$ = how many fourths?
25. $2\frac{1}{4} + 1\frac{1}{4} + \frac{1}{4} = ?$
26. $3\frac{3}{4} + 2\frac{1}{4} = ?$

27. *Subtract* 3 fourths
1 fourth

28. *Subtract* $\frac{3}{4}$
$\frac{1}{4}$

29. $\frac{3}{4} - \frac{1}{4} = ?$
30. $3\frac{3}{4} - 2\frac{1}{4} = ?$
31. $5\frac{1}{2} - \frac{1}{4} = ?$
32. $5\frac{1}{2} - 3\frac{1}{4} = ?$
33. $6\frac{3}{4} - 2\frac{1}{2} = ?$
34. $7\frac{1}{2} - 6\frac{1}{4} = ?$
35. $9\frac{1}{4} - 5\frac{1}{4} = ?$
36. $6\frac{3}{4} - 4\frac{1}{2} = ?$
37. $8\frac{3}{4} - 4\frac{1}{2} = ?$
38. $\frac{1}{2} - \frac{1}{4} = ?$
39. $\frac{3}{4} - \frac{1}{4} = ?$
40. $4\frac{1}{4} - 2\frac{1}{4} = ?$
41. $6\frac{1}{2} - 4\frac{1}{2} = ?$
42. $8\frac{1}{4} - 6\frac{1}{4} = ?$
43. $7\frac{3}{4} - 3\frac{1}{4} = ?$
44. $9\frac{1}{4} - 8 = ?$
45. $3\frac{1}{2} - 2\frac{1}{4} = ?$
46. $5\frac{1}{2} - 3\frac{1}{4} = ?$

1. How many eighths are there in a unit?

2. $\frac{5}{8} + \frac{2}{8}$ = how many eighths?

3. $\frac{3}{8} + \frac{1}{8} + \frac{3}{8}$ = how many eighths?

4. Eleven eighths would be how much more than a unit?

5. $\frac{1}{8}$ of \$32 = ?

6. $\frac{1}{8}$ of 16 oz. = ?

7. $\frac{1}{8}$ of 40¢ = ?

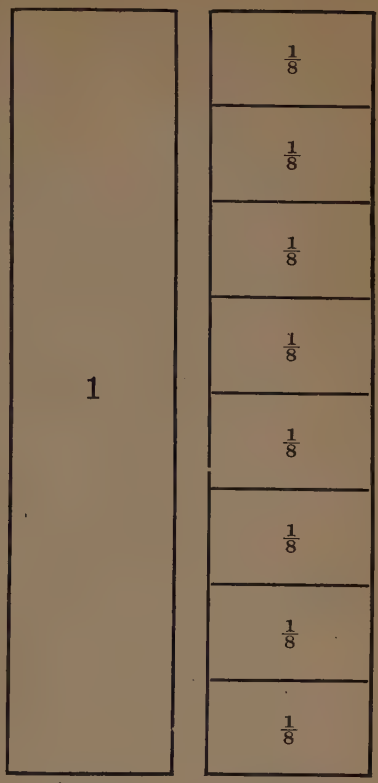
8. How many eighths are there in $\frac{1}{2}$?

9. How many eighths are there in $\frac{1}{4}$?

10. $\frac{4}{8} + \frac{2}{8} + \frac{1}{8}$ = how many eighths?

11. $\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$ = how many eighths?

12. Five eighths is how much less than a unit?



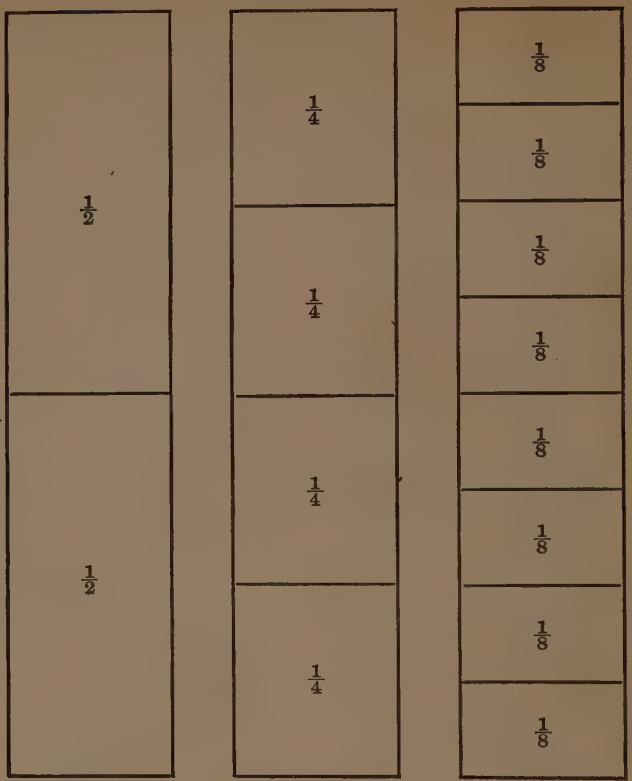
13. Five eighths is how much more than a half?

14. Which is larger, $\frac{3}{8}$ or $\frac{1}{2}$?

15. In a spelling lesson of 48 words John missed $\frac{1}{8}$ of them. How many did he miss?

16. One eighth of 24 hr. is how many hours?

17. A melon worth 40 cents was cut into eight equal parts. What was each part worth?



1. How many halves are there in a unit? How many fourths? How many eighths?

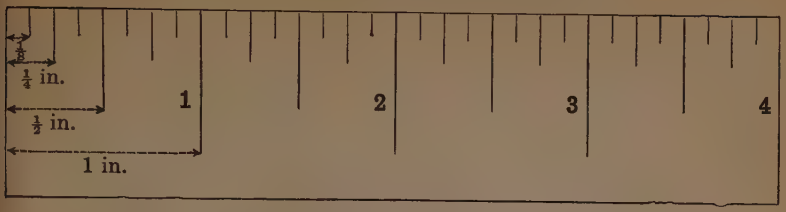
2. $\frac{1}{2}$ = how many fourths? How many eighths?

3. $\frac{1}{4}$ = how many eighths?

4. $\frac{3}{4}$ = how many eighths?

5. $\frac{7}{8}$ is how much more than $\frac{3}{4}$?

6. Is $\frac{5}{8}$ more or less than $\frac{1}{2}$?



1. How many inch spaces are there on this rule?

2. How many half inch spaces are there in one inch?

3. How many half inches are there in two inches? In three inches? In four inches?

4. How many quarter inches are there in one inch? In half an inch? In two inches?

5. How many eighths of an inch are there in one inch? In half an inch?

6. One inch equals how many half inches? How many quarter inches? How many eighths of an inch?

7. Two half inches are how many inches?

8. Four half inches are how many inches?

9. A quarter inch is how many eighths of an inch?

10. A half inch is how many eighths of an inch?

11. 1 in. + 1 in. + 1 in. = how many inches?

12. ½ in. + ½ in. + ½ in. = how many inches?

13. ½ in. + ½ in. + ¼ in. = how many inches?

14. ¼ in. + ¼ in. + ½ in. + ½ in. = how many inches?

15. ¾ in. + ½ in. = how many inches?

16. ¾ in. + ¾ in. = how many inches?

A UNIT 5 FIFTHS

1. A unit is equal to how many fifths?

2. How many fifths would there be in two units?

3. Three units is equal to how many fifths?

4. $\frac{2}{5}$ and $\frac{2}{5}$ make how many fifths?

5. $\frac{1}{5}$ of 10 cents is how many cents?

6. $\frac{2}{5}$ of 10 cents is how many cents?

7. How many cents are there in $\frac{1}{5}$ of a dollar?

8. $\frac{1}{5}$ of \$40 = how many dollars?

9. Which is more, $\frac{1}{5}$ of 40 or $\frac{1}{4}$ of 40?

10. Five boys were playing ball. They broke a window. What part of the damage do you think each one should pay? If the window cost 75¢, what was each one's share?

11. $\frac{1}{5} + \frac{1}{5} + \frac{1}{5} =$ how many fifths?

12. Do you think $\frac{3}{5}$ is greater or less than $\frac{1}{2}$? Why?

13. Add $\frac{3}{5}$, $\frac{2}{5}$, and $\frac{4}{5}$. The sum is how much more than a unit?

14. From $3\frac{4}{5}$ take $2\frac{1}{5}$.

1. A unit is equal to how many tenths?

2. How many tenths are there in two units? In three units?

3. $\frac{1}{2}$ a unit equals how many tenths?

4. $\frac{3}{10} + \frac{4}{10}$ equals how many tenths?

5. $\frac{5}{10}$ is how much more than $\frac{3}{10}$?

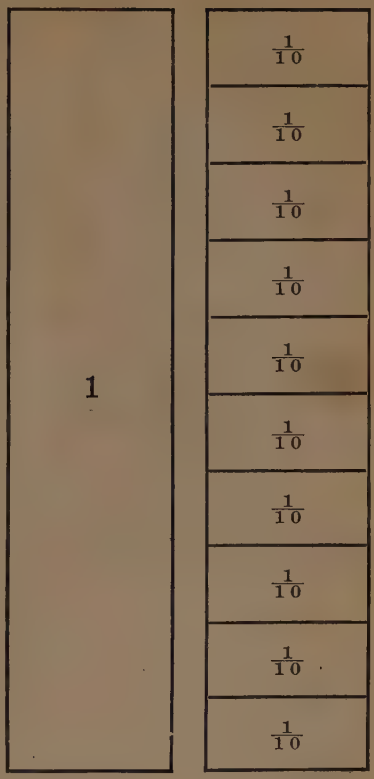
6. $\frac{1}{10}$ of \$50 is how many dollars?

7. $\frac{1}{10}$ of a dollar is how many cents?

8. $\frac{3}{10}$ of a dollar is how many cents?

9. $\frac{5}{10}$ of a dollar is how many cents?

10. $\frac{9}{10}$ of a dollar is how many cents?



A UNIT 10 TENTHS

11. $\frac{1}{10}$ of a dime is how many cents?

12. $\frac{3}{10}$ of a dime is how many cents?

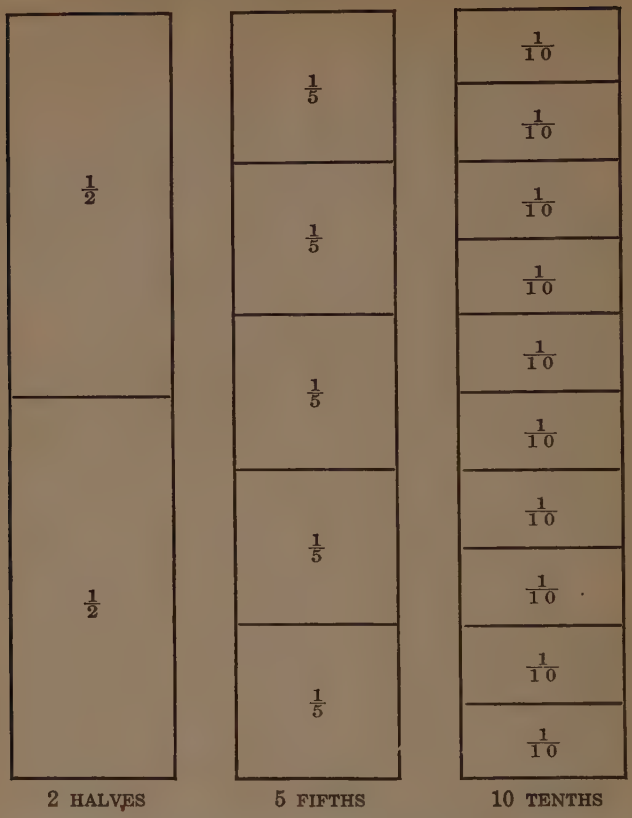
13. Add $\frac{3}{10}$, $\frac{1}{10}$, and $\frac{5}{10}$.

14. $\frac{3}{10}$ is how much more than a unit?

15. Add $\frac{5}{10}$, $\frac{7}{10}$, and $\frac{1}{10}$.

16. From $6\frac{9}{10}$ take $3\frac{2}{10}$.

17. $\frac{1}{10} + \frac{1}{10} + \frac{3}{10} + \frac{2}{10} = ?$



1. A unit is equal to how many halves? How many fifths? How many tenths?

2. Is $\frac{2}{5}$ more or less than $\frac{1}{2}$?
3. Is $\frac{3}{5}$ more or less than $\frac{1}{2}$?
4. $\frac{1}{2}$ = how many tenths?
5. $\frac{1}{5}$ = how many tenths?
6. $\frac{4}{5}$ = how many tenths?
7. $\frac{2}{5} = \frac{?}{10}$
8. $\frac{3}{5} = \frac{?}{10}$
9. $\frac{8}{10} = \frac{?}{5}$
10. $\frac{10}{10} = \frac{?}{5}$
11. $\frac{5}{10} = \frac{?}{2}$

1. A yard is 3 ft. long. What part of a yard is 1 ft.?

2. What part of a yard is 2 ft.?

3. How many thirds are there in a unit? In two units?

4. One third of \$9 is how many dollars?

5. One third of 24 hr. is how many hours?

6. What is $\frac{1}{3}$ of 9? $\frac{1}{3}$ of 12?

7. What is $\frac{2}{3}$ of 9? $\frac{2}{3}$ of 12? $\frac{2}{3}$ of 15?

8. $\frac{2}{3} + \frac{2}{3} + \frac{2}{3} =$ how many thirds?

9. $\frac{6}{3}$ is equal to how many units?

10. Which is more, $\frac{1}{3}$ of 12 or $\frac{1}{4}$ of 12?

11. $\frac{4}{3}$ is how much more than a unit?

12. $1\frac{2}{3}$ is how many thirds?

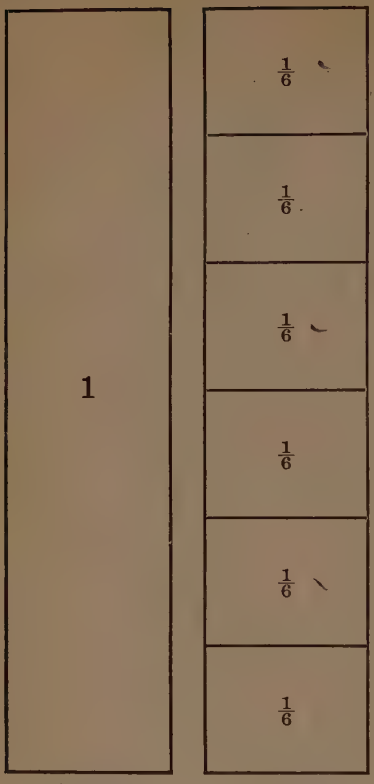
13. $3\frac{1}{3} + 5 + 4\frac{1}{3} =$?

14. How much must be added to $\frac{2}{3}$ to make a unit?

15. From $8\frac{2}{3}$ take $3\frac{1}{3}$.

16. Which is larger, $\frac{1}{2}$ or $\frac{1}{3}$?

17. Is $\frac{2}{3}$ more or less than $\frac{1}{2}$?



A UNIT 6 SIXTHS

1. How many sixths are there in a unit? In two units?

2. How many sixths are there in $\frac{1}{2}$ a unit?

3. What is $\frac{1}{6}$ of \$24?

4. $\frac{1}{6}$ of 12 hr. is how many hours?

5. $\frac{1}{6} + \frac{4}{6} =$ how many sixths?

6. $\frac{3}{6}$ is how much more than $\frac{1}{6}$?

7. How many sixths are there in $\frac{1}{3}$ of a unit? In $\frac{2}{3}$ of a unit?

8. Draw a line 1 foot long. Divide it into 6 equal parts. Measure one of these parts. How long is it?

9. How many inches are there in $\frac{1}{6}$ of a foot?

Add:

10.	11.	12.	13.	14.
$\frac{1}{6}$	$\frac{5}{6}$	$\frac{2}{6}$	$\frac{4}{6}$	$\frac{1}{6}$
$\frac{2}{6}$	$\frac{3}{6}$	$\frac{1}{6}$	$\frac{2}{6}$	$\frac{1}{6}$
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{3}{6}$	$\frac{2}{6}$	$\frac{2}{6}$
$\frac{3}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{5}{6}$	$\frac{2}{6}$

1. How many twelfths are there in a unit?

2. How many twelfths are there in two units?

3. $\frac{1}{2}$ of a unit is how many twelfths? $\frac{1}{3}$ of a unit? $\frac{1}{4}$ of a unit?

4. What is $\frac{1}{12}$ of 36 inches?

5. What is $\frac{1}{12}$ of 24 days?

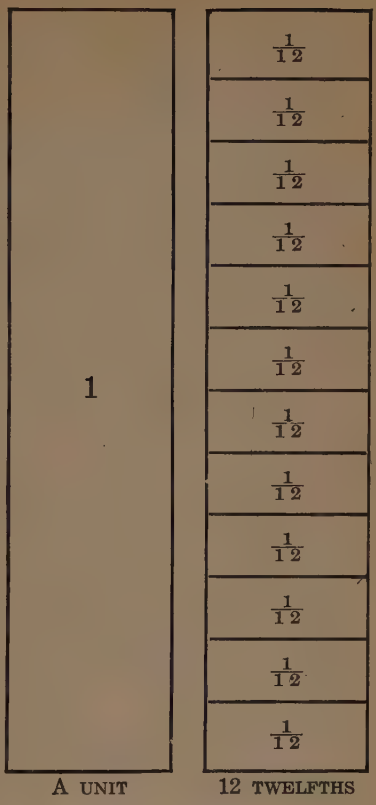
6. $\frac{1}{12}$ of \$48 is how many dollars?

7. $\frac{1}{12}$ of 24 hr. is how many hours?

8. How many minutes are there in $\frac{1}{12}$ of an hour?

9. Is $\frac{5}{12}$ more or less than $\frac{1}{2}$?

10. $\frac{4}{12}$ is how much less than $\frac{7}{12}$?



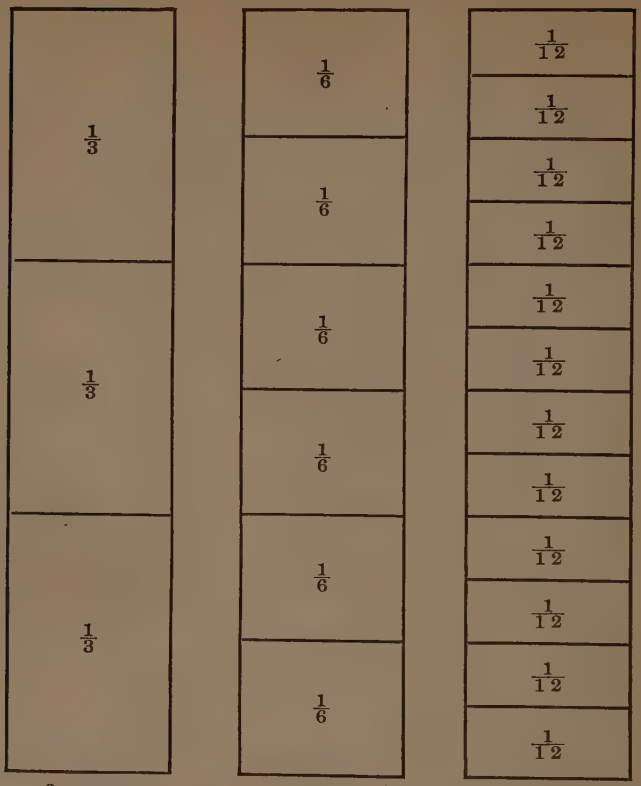
11. Draw a line two feet long. Divide it into twelve equal parts. Measure one part. How many inches long is it?

12. $\frac{3}{12} + \frac{2}{12} + \frac{5}{12} + \frac{1}{12} = ?$

13. $\frac{4}{12} + \frac{5}{12} + \frac{7}{12} + \frac{1}{12} = ?$

14. $6\frac{7}{12} - 2\frac{5}{12} = ?$

15. $4\frac{9}{12} - 3\frac{3}{12} = ?$



3 THIRDS 6 SIXTHS 12 TWELFTHS

1. A unit is how many thirds? How many sixths? How many twelfths?

2. One third of a unit is equal to how many sixths? How many twelfths?

3. $\frac{1}{6}$ = how many twelfths?

4. $\frac{2}{6}$ = how many twelfths?

5. $\frac{5}{6} = \frac{?}{12}$

6. $\frac{2}{3} = \frac{?}{6}$

7. $\frac{1}{2} = \frac{?}{12}$

Whenever we wish to speak of less than a unit, we must use some expression like one half, one third, one fourth, one eighth, two thirds, three fourths, five twelfths, etc. These numbers are called *fractions* because they are parts of a unit. The word *fraction* comes from a word meaning *to break*. When a unit is broken into parts, the parts are fractions.

A fraction is a part of a unit.

12 inches	**= 1 foot**
3 feet	**= 1 yard**

1. Name three articles that are bought by the yard.

2. How many inches tall are you?

3. How many feet long is a rug in your home? How many feet wide is it?

4. How many feet wide is the schoolroom? How many feet long is it?

5. Change 36 inches to feet.

6. Change 5 feet to inches.

7. Change 72 inches to yards.

8. Change 4 yards to inches.

9. A telephone line is 400 yards long. How many feet long is it?

10. A spool of silk contains 50 yards. How many feet of silk does it contain?

2 pints	**=**	**1 quart**
8 quarts	**=**	**1 peck**
4 pecks	**=**	**1 bushel**

Strawberries are bought by the quart.

Name other fruits or vegetables sold by the quart.

Fresh peas are bought by the peck.

Can you name other vegetables that are bought by the peck?

Potatoes and apples are sold by the bushel.

Name vegetables, fruits, and grains that are sold by the bushel.

1. How many quarts are there in two pecks?
2. Change 8 pecks to bushels.
3. A bag contains two bushels of oats. How many quarts of oats are there in the bag?
4. A basket of peaches contains 24 quarts. How many pecks of peaches are there in the basket?
5. From a three-bushel bag of clover seed, twenty quarts have been used. How many quarts remain?

2 pints (pt.)	**= 1 quart (qt.)**
4 quarts	**= 1 gallon (gal.)**

Vinegar, milk, and varnish are sold by the quart.
Name several articles that are sold by the quart.
Paint, syrup, and molasses are sold by the gallon.
Name other articles that are sold by the gallon.

1. How many quarts are there in 2 gallons?

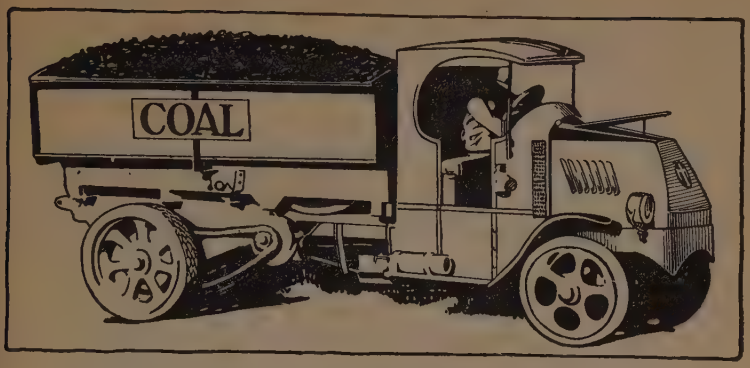
2. Sixteen quarts of syrup are placed in gallon cans. How many cans are filled?

3. Twenty quarts of milk are delivered in pint bottles. How many bottles are used?

4. Change 12 gallons to pints.

5. Change 64 pints to gallons.

6. Which will contain more milk, 9 pint bottles or a gallon pail? Why?



16 ounces (oz.) = 1 pound (lb.)
100 pounds = 1 hundredweight (cwt.)
2000 pounds = 1 ton (T.)

Coffee, tea, and butter are sold by the pound.
Name several articles sold by the pound.

Sugar, feed, and salt are sold by the hundredweight.
Name several articles sold by the hundredweight.

Coal, cabbage, and hay are sold by the ton.
Name several articles sold by the ton.

1. How many ounces are there in the following: 5 lb.; 7 lb.; 3 lb.; $4\frac{1}{2}$ lb.; $2\frac{1}{2}$ lb.; $3\frac{1}{4}$ lb.?

2. How many pounds are there in the following: 32 oz.; 24 oz.; 20 oz.; 3 cwt.; 5 cwt.; 2 T.; $3\frac{1}{2}$ T.?

3. James paid 6 cents a pound for sugar. How much did he pay for 2 lb. and 8 oz.?

4. Coal cost $14 a ton. How much did 10 cwt. cost?

In solving problems keep in mind these four steps:

First: Read the problem carefully.
Second: Tell what is given.
Third: Tell what is to be found.
Fourth: Tell how it is to be found.

1. Milton paid 6 cents for string, 8 cents for wood, and 11 cents for other materials used in building a kite. What did the kite cost him?

2. Lois used 2 pounds of sugar from a bag containing 10 pounds. How many pounds were left?

3. Floyd sold eight quarts of strawberries at 12¢ a quart. What did he receive for the berries?

4. Betty received 90 cents for taking care of the baby 9 hours. How much did she earn each hour?

5. Herman walks two miles to school each morning and two miles back to his home at night. How many miles each week does he walk in going to and from school?

6. Ralph purchased eight dozen strawberry plants at one dollar a dozen. Find the cost of the plants.

7. From a basket containing 200 towels, 96 are used. How many towels remain in the basket?

8. Fred helped his father at the filling station Saturday. In the morning he sold 90 gallons of gas, in the afternoon 185 gallons, and in the evening 240 gallons. How many gallons of gas did he sell?

9. Find the cost of one orange when a dozen cost 72 cents.

10. How many inches are there in two feet?

11. How many minutes are there in four hours?

12. How many yards are there in 6 feet?

13. What must be paid for 8 grapefruit at 10 cents each?

14. Gertrude paid 20 cents for sugar, 8 cents for butter, 12 cents for bread, and 14 cents for eggs as her share of the cost of a class supper. What did she pay in all?

15. John and his father drove their car 210 miles in one day. John drove 85 miles. How many miles did his father drive?

16. In a class of 48 pupils, 28 stood 100% in a spelling test. How many did not stand 100%?

17. Find the cost of 800 apple trees at 2 dollars each.

18. What must be paid for one school desk if 12 desks cost $132?

19. From a can containing 40 quarts of milk, 22 quarts are used. How many quarts remain?

20. An article costing ten dollars is sold for twelve dollars. What is the gain?

21. How many eggs are there in one dozen?

22. If each boy is given one orange, how many dozens are required for 24 boys?

23. Three dozen oranges are how many oranges?

24. How many ounces are there in one pound?

25. How can I find the number of ounces in five pounds?

26. John bought 32 ounces of meat. How many pounds did he buy?

27. What will one dozen pencils cost at two cents each?

28. Find the cost of one pound of butter at 4 cents an ounce.

29. Florence sold one dozen eggs at the rate of three cents each. What did she receive for the eggs?

30. How many ounces are there in two pounds?

31. Find the cost of two quarts of milk at 6 cents a pint.

32. What must Charles pay for a gallon of vinegar at the rate of 10 cents a quart?

33. Mrs. Taylor sold four gallons of maple sirup. How many quarts did she sell?

34. Our school purchased twenty gallons of ice cream and sold it all by the quart. How many quarts did we sell?

35. Mr. Smith bought 2 gallons of cream and sold all of it by the pint. How many pints did he sell?

36. Martha purchased one yard of silk ribbon. How many inches of ribbon did she buy?

37. A rope is 12 feet long. How many yards long is it?

38. Seven yards is how many feet?

39. A piece of cardboard is two feet wide and three feet long. Find its width and length in inches.

40. A room is 24 feet wide and 36 feet long. Find its width and length in yards.

41. Peter has two dollars in quarters. How many quarters has he?

42. Sarah's mother gave her a half dollar. Sarah exchanged it for one quarter, two dimes, and four pennies. How much did she lose by the exchange?

43. Mr. Wilcox offers to give Frank his choice of a one-dollar bill or three quarters, one dime, and four nickels. Which would you take if you were in Frank's place?

44. How many quarts are there in two pecks?

45. Helen sold three pecks of strawberries. How many quarts did she sell?

46. Wilfred gathered four pecks of peas. How many quarts did he gather?

47. Milton's father sold eight pecks of potatoes. How many bushels did he sell?

48. Mr. Smith sold five bushels of peaches by the peck. How many pecks did he sell?

49. If I know the cost of one book, how can I find the cost of five books?

50. If I know the cost of each of four articles purchased, how can I find the cost of the four taken together?

51. If I know the total cost of a book and a pencil and I know the cost of the pencil, how can I find the cost of the book?

52. If I know the cost of seven dozen eggs, how can I find the cost of one dozen?

53. Mary gave the grocer a dollar bill. If she knows the amount of her purchases, how can she find the change the grocer should return to her?

54. John receives two dollars a week for helping a neighbor. How can he tell how much he should receive for four weeks' work?

55. A certain sum of money is to be divided equally among five boys. What part of the money will each boy receive?

56. If Mr. Harrison knows the cost of one ton of coal, how can he find the cost of eight tons of coal?

57. A bar of soap costs 8 cents, a can of corn 16 cents, and a quart of oysters 70 cents. How can you find the cost of the three together?

58. From a basket containing a certain number of eggs, twelve are sold. How can you find the number of eggs remaining in the basket?

59. How can I find the length of a rope in feet if I know its length in inches?

60. If I know the cost of a house and the cost of a lot, how may I find the cost of both together?

1. Draw lines on your paper which are the same length as the following lines.

*A.*_____

*B.*_____

*C.*_____

*D.*_____

*E.*_____

*F.*_____

*G.*_____

*H.*___

2. Draw a line which shall equal *C* and *F* taken together.

3. Draw a line which shall equal *D* and *E* taken together.

4. Draw a line equal to *B* and *H* taken together. *A* and *H* taken together.

5. Draw a line equal to *C* less *F*.

6. Draw a line equal to *D* less *F*.

7. How much longer is *A* than *F*?

8. How much longer is *B* than *F*?

9. How much longer is *E* than *A*?

10. How many lines like *F* must be taken to make one line two inches long?

11. How many lines like *F* must be taken to make a line five inches long?

12. How many lines like *G* must be used to make one like *F*?

Go to the store with mother and find the cost of each of these articles:

one pound of butter	one dozen eggs . . . . .
one pound of coffee	one dozen oranges . . . . .
one quart of milk	one dozen bananas . . . . .
one pound of sugar	one loaf of bread . . . . .
one head of cabbage	one head of lettuce . . . . .
one pound of prunes	one pound of oatmeal . . . . .
one pound of crackers	one pound of potatoes . . . . .
one grapefruit	one can of corn . . . . .
one can of salmon	one pound of dried beef . . . . .
one pound of bacon	one dozen cookies . . . . .

1. Which costs more, one pound of butter or one pound of coffee?

2. What will twelve grapefruit cost?

3. Find the cost of $\frac{1}{2}$ dozen eggs.

4. Find the cost of one can of salmon, one can of corn, and one loaf of bread.

5. What change is received from a dollar when two pounds of oatmeal, five pounds of sugar, and $\frac{1}{2}$ dozen bananas are purchased?

6. A family ate two loaves of bread, $\frac{1}{2}$ pound of butter, 6 oranges, 1 pound of sugar, one half dozen cookies, one half dozen eggs, two pounds of potatoes, and one pound of bacon in one day. What was the total cost of these articles?

7. What must be paid for two pounds of bacon and $\frac{1}{2}$ pound of dried beef?

8. Ask your teacher if you may play store. Use the cardboard money you made last term.

Ask mother for the box in which the groceryman delivered eggs.

1. How many eggs will it hold?

2. If this box was filled with eggs, what did they sell for at 36 cents a dozen?

3. If the box was half full of eggs, what would they be worth at 4 cents each?

4. If there are 3 eggs in the box, how many more are required to fill it?

5. How many boxes would be required to hold 36 eggs?

6. Three oranges are what part of a dozen oranges?

7. Name four articles that are bought by the dozen. Ask the storekeeper the prices of these articles. Fill in the following table.

Article	Price of One Dozen	Price of One-half Dozen	Price of			
			18	24	36	30
1.						
2.						
3.						
4.						

8. Find the cost of 60 cans of corn at —— a dozen.

9. What must James pay for 4 large buttons for his overcoat at —— cents a dozen?

10. Arthur sold 4 dozen lemons at —— cents a dozen. How much did he receive for them?

Note. — Secure from your storekeeper the prices for examples 7, 8, 9, and 10.

Mental Tests

1

1. Andrew banks 10 cents every week. How many weeks does it take him to save $1?
2. 2×9 is how much more than 2×4?
3. A man walks 12 miles on Thursday, 8 miles on Friday, and 10 miles on Saturday. How far does he walk?
4. $6 \times 9 = ?$
5. John has $18 and Mary has $\frac{1}{2}$ as much. How much has Mary?

2

1. An airplane goes 700 feet above the earth. It then drops 200 feet. How far is it above the earth?
2. 2×11 is how much more than 3×7?
3. At 11¢ a quart, what will 4 quarts of milk cost?
4. At 10¢ each, how many tablets can be bought for 50 cents?
5. $12 is $\frac{1}{2}$ of Frank's money. How much money has he?

3

1. What will 5 pounds of figs cost at 20¢ a pound?
2. A board is 2 feet 6 inches long. How many inches long is it?
3. At $6 a yard, how many yards of silk can be bought for $18?
4. What is $\frac{1}{2}$ of $22?
5. $\$9 + \$2 + \$7 + \$6 = ?$

4

1. What part of a dozen is 6?
2. How many apples at 5 cents apiece can you buy for 25 cents?

3. What will 5 chairs cost at $12 each?
4. A hat cost $3 and a pair of shoes $6. What change is received from a $10 bill?
5. At $8 a ton how many tons of coal can be bought for $32?

5

1. How many inches are there in $\frac{1}{4}$ of a foot?
2. What is the price of one orange when 6 oranges cost 30 cents?
3. How many weeks in 35 days?
4. How many feet are there in one yard?
5. At $30 a ton what will 2 tons of feed cost?

6

1. 3 is what part of a dozen?
2. A boy earns $3 one week, $4 the next week, and $7 the third week. How many dollars does he earn in all?
3. At 9¢ a pound what will 10 pounds of sugar cost?
4. A man has $80 and spent $60. How much has he left?
5. A tree is 36 feet tall. The next tree is $\frac{1}{4}$ as tall. How tall is the second tree?

7

1. What will $\frac{1}{4}$ of a pound of candy cost at 80¢ a pound?
2. At 9¢ a foot what will a yard of pipe cost?
3. How many inches are there in 10 ft.?
4. I buy 3 spools of thread at 5 cents a spool. What change shall I receive from 25 cents?
5. What are the prime factors of 35?

8

1. What part of a gallon is two quarts?
2. How many quarts are there in 10 pints?
3. How many feet are there in 1 yard 2 feet?
4. Write the prime factors of 33.
5. If $\frac{1}{2}$ a pie cost 7¢, what will the whole pie cost?

9

1. At 3 cents each, how many cookies can be bought for 36 cents?
2. Add 25 cents and 13 cents.
3. How many pens at 15 cents a dozen can be bought for 30 cents?
4. What change should I receive from a half dollar if I buy one dozen oranges for 40 cents?
5. Change 48 inches to feet.

10

1. A pencil cost 3 cents, a pad 10 cents, a pen 1 cent, and a penholder 10 cents. What change was received from a quarter?
2. Subtract 16 from 24.
3. $\frac{1}{4}$ of a dozen = ?
4. Change 5 feet to inches.
5. What will 6 cakes of soap cost at 7 cents a cake?

11

1. There are five shelves in a bookcase. On each shelf are twenty books. How many books are there in the case?
2. Mrs. Smith's bill is 36 cents. She gives the clerk 50 cents. How much change does the clerk give Mrs. Smith?
3. Add $\frac{1}{4}$ and $\frac{3}{4}$.
4. $\frac{1}{3}$ of 36 = ?

5. John's father has 4 shrubs in his yard. He needs 14 shrubs for a hedge. How many more must he buy?

12

1. There are 36 sheets of paper in a tablet. If 2 sheets of paper are used each day, how many days will the tablet last?
2. $\frac{1}{3} + \frac{2}{3} = ?$
3. Subtract 20¢ from 50¢.
4. When 6 rolls cost 12 cents, what will a dozen cost?
5. At 3 cents a day for milk, how much money is needed to pay for milk for one week at school?

13

1. $\frac{3}{4} - \frac{1}{4} = ?$
2. $54 \div 9 = ?$
3. What did a boy receive for 7 errands at 10 cents for each errand?
4. Find the cost of 2 dozen bananas at 30 cents a dozen.
5. How many feet are there in 24 inches?

14

1. The divisor is 8. The dividend is 56. Find the quotient.
2. John earned 65 cents. He gave a quarter to the Junior Red Cross. How much money has he left for his bank?
3. $6 \times ? = 42$.
4. $35 + 6 + 7 + 8 + 3 = ?$
5. At 8 cents a yard find the cost of 4 yards of ribbon.

15

1. $\frac{3}{5} + \frac{2}{5} = ?$
2. $27 + ? = 36$.
3. A book contains 96 pages. Henry read one fourth of the book. How many pages did he read?
4. How many gallons are there in 20 quarts?
5. $25 + 8 + 9 + 6 + 4 = ?$

Tests of Accomplishment

I

1. Write one hundred seven thousand thirty-five in figures.

Write 29 in Roman numerals.

2. Multiply \$81.09 by 30.

3. Subtract 830642
412713

4. There are 8 quarts in 1 peck. How many pecks are there in 1426 quarts?

5. Change 30 feet to yards.

II

1. Mr. Wood bought milk for \$5.40 and sold it for \$7.60. How much did he gain?

2. Multiply 947 by 705.

3. There are 7 days in 1 week. How many weeks are there in 8276 days?

4. Divide 17085 by 46.

5. Change 12 pecks to bushels.

III

1. What will 7 hammers cost at $1.50 each?
2. Divide 67246 by 79.
3. Change 16 gallons to pints.
4. Find the cost of 4000 pounds of corn meal at $30 a ton.
5. Add 93645
   87736
   29947
   83964
   74629

IV

1. Find the cost of 409 quarts of milk at 9¢ a quart.
2. Divide 97800 by 300.
3. How many inches are there in 11 feet?
4. Change $\frac{2}{3}$ to twelfths.
5. $605 + 289 + 597 + 236 + 976 = ?$

V

1. Multiply 497 by 900.
2. Subtract 936487
   257699
3. Divide 43423 by 63.
4. Find the cost of 144 grapefruit at 90¢ a dozen.
5. $\frac{1}{12} + \frac{5}{12} + \frac{5}{12} = ?$

FOURTH GRADE — SECOND HALF

Reading and Writing Numbers

5	Five
50	Fifty
500	Five hundred
5,000	Five thousand
50,000	Fifty thousand
500,000	Five hundred thousand
5,000,000	Five million

Read:

1. 8; 80; 800; 8000; 80,000; 800,000; 8,000,000.
2. 96,000; 9600; 960; 96; 9,600,000; 960,000.
3. 66; 7; 555; 8888; 99,999; 444,444; 3,333,333.
4. 9; 83; 764; 8101; 96,787; 703,063; 2,586,321.
5. In 1925 the population of Syracuse, N. Y., was about 200,000; of Solvay, N. Y., nearly 8000; of Cortland, about 13,000.
6. In 1920 the population of New York City was 5,620,048; of Buffalo, 506,775; of Albany, 113,344; of Utica, 94,156; and of New Rochelle, 36,213.
7. In 1819 the United States purchased the Florida Province from Spain for $5,000,000.
8. Alaska contains 590,884 square miles.
9. The area of the United States is 3,805,259 sq. mi.

One hundred eighty-six million is written

186,000,000

One hundred eighty-six million, seven hundred ninety-four thousand is written

186,794,000

One hundred eighty-six million, seven hundred ninety-four thousand, three hundred twenty-five is written

186,794,325

Write:

1. Thirteen million. Thirty million. Three hundred million.
2. Five million. Fifteen million. Three hundred fifteen million.
3. Forty-two million, three hundred sixty-four thousand.
4. One hundred twenty-two million, six hundred ninety-two thousand.
5. Seventy-five thousand.
6. Seventy-five million.

Read:

7. 3,086,000	10. 1,001,000	13. 10,506,261
8. 5,207,000	11. 6,801,000	14. 90,056,315
9. 4,006,000	12. 9,046,000	15. 27,208,848

Write in figures:

16. Eight thousand, two hundred twenty-six.
17. Six thousand, three hundred one.
18. Two thousand, twenty-four.
19. Eight thousand, four.
20. Sixteen thousand, five hundred four.

Roman Numerals

The ancient Romans expressed numbers by means of letters. These Roman numerals are still in use for numbering chapters in books, and for inscriptions of dates on buildings. The figures on the clock dial are often Roman numerals.

Seven letters are used: viz.—

I	V	X	L	C	D	M
1	5	10	50	100	500	1000

I = 1		XI = 10 + 1 = 11	
II = 2		XII = 10 + 2 = 12	
III = 3		XIII = 10 + 3 = 13	
IV = 5 − 1 = 4		XIV = 10 + 4 = 14	
V = 5		XV = 10 + 5 = 15	
VI = 5 + 1 = 6		XVI = 10 + 6 = 16	
VII = 5 + 2 = 7		XVII = 10 + 7 = 17	
VIII = 5 + 3 = 8		XVIII = 10 + 8 = 18	
IX = 10 − 1 = 9		XIX = 10 + 9 = 19	
X = 10		XX = 10 + 10 = 20	

Supply the numerals:

	Roman	Arabic	Arabic	Roman
1.	XXIV (20 + 4)	= ?	25	= ?
2.	XXIII	= ?	28	= ?
3.	XXIX (20 + 9)	= ?	26	= ?
4.	XXVII	= ?	22	= ?
5.	XXXIII	= ?	32	= ?
6.	XXXIV	= ?	35	= ?
7.	XXXIX	= ?	37	= ?
8.	XL (50 − 10)	= ?	41	= ?

Supply the numerals:

	Roman		Arabic		Arabic		Roman
1.	XLIV	=	?		43	=	?
2.	XLVII	=	?		48	=	?
3.	XLIX	=	?		45	=	?
4.	LIV (50 + 4)	=	?		59	=	?
5.	LV	=	?		58	=	?
6.	LX (50 + 10)	=	?		68	=	?
7.	LXIX	=	?		63	=	?
8.	LXXIX (70 + 9)	=	?		78	=	?
9.	LXXIV	=	?		73	=	?
10.	LXXXV	=	?		89	=	?
11.	XCVI (100 − 10 + 6)	=	?		97	=	?
12.	XCIX	=	?		91	=	?
13.	CL (100 + 50)	=	?		160	=	?
14.	CC	=	?		300	=	?
15.	CCXL (200 + 40)	=	?		290	=	?
16.	CD (500 − 100)	=	?		450	=	?
17.	CDLXX	=	?		495	=	?
18.	D	=	?		700	=	?
19.	DC	=	?		800	=	?
20.	CM (1000 − 100)	=	?		1000	=	?

Oral Drill

Give results rapidly:

1.	2.	3.	4.	5.
$24 + 7$	$37 + 6$	$29 + 5$	$69 + 9$	$48 + 4$
$38 + 5$	$39 + 8$	$98 + 8$	$73 + 6$	$37 + 7$
$73 + 9$	$43 + 4$	$63 + 7$	$56 + 8$	$54 + 7$
$45 + 4$	$54 + 5$	$72 + 9$	$96 + 6$	$64 + 9$
$66 + 5$	$53 + 8$	$49 + 6$	$87 + 7$	$88 + 9$
$78 + 7$	$49 + 7$	$84 + 6$	$54 + 9$	$78 + 6$

6.	7.	8.	9.	10.
$49 - 9$	$81 - 7$	$50 - 9$	$91 - 8$	$25 - 8$
$34 - 8$	$92 - 8$	$21 - 3$	$33 - 7$	$48 - 9$
$17 - 2$	$35 - 7$	$40 - 7$	$52 - 9$	$33 - 7$
$94 - 6$	$79 - 7$	$70 - 9$	$33 - 4$	$43 - 5$
$42 - 7$	$41 - 6$	$46 - 9$	$53 - 8$	$64 - 7$
$31 - 4$	$24 - 7$	$35 - 6$	$74 - 7$	$85 - 8$

11.	12.	13.	14.
$24 + 10$	$27 + 50$	$46 + 10$	$84 + 10$
$65 + 20$	$62 + 20$	$23 + 30$	$33 + 70$
$84 + 40$	$75 + 30$	$31 + 80$	$52 + 30$
$52 + 30$	$53 + 40$	$52 + 20$	$75 + 20$
$21 + 40$	$34 + 60$	$46 + 30$	$61 + 40$
$38 + 30$	$71 + 30$	$70 + 40$	$36 + 50$

15.	16.	17.	18.
$32 + 70$	$36 - 10$	$43 - 20$	$97 - 70$
$44 + 40$	$75 - 40$	$34 - 30$	$84 - 40$
$31 + 60$	$26 - 20$	$36 - 20$	$63 - 30$
$78 + 20$	$87 - 50$	$47 - 30$	$75 - 20$
$57 + 40$	$48 - 30$	$54 - 40$	$86 - 30$
$17 + 80$	$72 - 60$	$78 - 50$	$45 - 30$

Time yourself. Can you do five exercises in less than a minute?

Addition without a Pencil

Add 25 and 47.

$25 + 40 = 65.$
$65 + 7 = 72.$ *Sum.* "Say 25, 65, 72."

Answer rapidly:

1.	$20 + 30$	**2.**	$40 + 40$	**3.**	$50 + 30$
4.	$60 + 20$	**5.**	$90 + 20$	**6.**	$70 + 20$
7.	$30 + 30$	**8.**	$70 + 30$	**9.**	$80 + 40$
10.	$20 + 38$	**11.**	$70 + 49$	**12.**	$80 + 73$
13.	$50 + 65$	**14.**	$82 + 40$	**15.**	$67 + 80$
16.	$\$.30 + \$.40$	**17.**	$\$.80 + \$.35$	**18.**	$\$.75 + \$.50$
19.	$29 + 26$	**20.**	$48 + 35$	**21.**	$79 + 76$
22.	$\$.25 + \$.36$	**23.**	$\$.76 + \$.21$	**24.**	$\$.36 + \$.80$
25.	$\$.92 + \$.31$	**26.**	$\$.85 + \$.66$	**27.**	$\$.72 + \$.43$
28.	$28 + 26$	**29.**	$62 + 28$	**30.**	$62 + 24$
31.	$42 + 75$	**32.**	$57 + 36$	**33.**	$65 + 34$
34.	$63 + 29$	**35.**	$72 + 29$	**36.**	$53 + 46$
37.	$27 + 38$	**38.**	$35 + 26$	**39.**	$64 + 44$
40.	$45 + 34$	**41.**	$44 + 38$	**42.**	$73 + 27$

43. 18 boys and 23 girls are how many pupils?

44. 39 boxes of Pippins and 56 boxes of Jonathans are how many boxes of apples?

45. Julian had 40 cents in his pocket and 93 cents in the bank. How much money had he?

46. Let each member of the class, after adding those previously given him, give two numbers for the next pupil to add.

47. Let each pupil make a problem.

Add, and test by adding in a different order:

1.	2.	3.	4.
7485	$91.36	$43.96	3029
234	8.42	8.40	89
21	9.30	70.90	673
783	70.84	.08	80
3416	6.96	3.40	884
692	1.35	9.71	97
48	2.84	.68	786
984	.89	40.83	4839

5.	6.	7.	8.
12	8070	13	4276
483	23	354	7
324	625	27	721
1728	8	108	103
837	184	73	87
6143	70	281	36
296	989	7	84
84	71	5724	376
481	133	198	1001

9.	10.	11.	12.
5278	$ 1.28	3208	$216.80
7	52.13	17	187.20
175	.01	376	47.00
3822	3.92	1879	6.00
80	48.03	5	700.63
143	3.72	1003	25.75
97	1.19	84	283.74
402	.09	172	108.13

Subtraction without a Pencil

$83 - 57 = ?$
$83 - 50 = 33.$
$33 - 7 = 26.$ *Difference.* "Say 33, 26."

Answer rapidly:

1.	$70 - 30$	2.	$90 - 20$	3.	$60 - 40$
4.	$86 - 20$	5.	$73 - 50$	6.	$69 - 30$
7.	$90 - 25$	8.	$80 - 37$	9.	$40 - 17$
10.	$58 - 33$	11.	$66 - 31$	12.	$79 - 45$
13.	$97 - 48$	14.	$58 - 39$	15.	$71 - 56$
16.	$38 - 19$	17.	$72 - 26$	18.	$63 - 25$
19.	$27 - 18$	20.	$66 - 37$	21.	$48 - 19$
22.	$42 - 15$	23.	$92 - 48$	24.	$51 - 27$
25.	$61 - 22$	26.	$87¢ - 39¢$	27.	$84¢ - 47¢$
28.	$\$.81 - \$.36$	29.	$\$.42 - \$.29$	30.	$\$.75 - \$.39$

31. How much change is due in each case if one dollar is offered in payment for each of these purchases: $39¢$; $48¢$; $62¢$; $79¢$; $33¢$; $29¢$; $87¢$; $62¢$?

32. The sum of two numbers is 87. One of them is 49. What is the other?

33. What must be added to 45 to make 91?

34. What is gained by buying cloth at $47¢$ a yard and selling it at $75¢$ a yard?

35. John's heart beat 78 times a minute when he was well, but 130 times a minute during a severe illness. How much faster did the heart beat during illness than in health?

Answer rapidly:

1. $100 - 35$	2. $85 - 21$	3. $98 - 35$
4. $86 - 33$	5. $65 - 19$	6. $77 - 30$
7. $76 - 55$	8. $83 - 25$	9. $43 - 24$
10. $26 - 13$	11. $29 - 23$	12. $93 - 28$
13. $87 - 29$	14. $68 - 39$	15. $83 - 24$
16. $78 - 39$	17. $66 - 57$	18. $96 - 49$
19. $69 - 50$	20. $37 - 29$	21. $81 - 27$
22. $91 - 45$	23. $56 - 28$	24. $88 - 69$
25. $38 - 17$	26. $65 - 56$	27. $53 - 24$
28. $59 - 23$	29. $99 - 35$	30. $85 - 47$
31. \$.85 − \$.48	32. \$.57 − \$.48	33. 68¢ − 49¢
34. \$.79 − \$.68	35. \$.48 − \$.29	36. 37¢ − 18¢

37. How much change is due in each case if seventy-five cents is offered in payment for each of these purchases: 58¢; 33¢; 69¢; 38¢; 29¢?

38. Mary's allowance for her school lunches for a week was \$1. How much did she have left each day if she spent 23¢ Monday; 19¢ Tuesday; 13¢ Wednesday; 29¢ Thursday, and 15¢ Friday?

39. Jane spent 96¢ for flour and sugar. The sugar cost 45¢. How much did the flour cost?

40. John bought a tablet and a notebook for 25¢. He gave the clerk a dollar bill. How much change did he receive?

41. Charles' mother baked a birthday cake for him. It cost 62¢. The chocolate icing cost 17¢. How much did the other materials cost?

\$1.60	\$6.25	\$1.34
5	30	24
\$8.00	\$187.50	536
		268
		\$32.16

Notice that there are *two* figures after the decimal point in the *product*, the same as in the multiplicand.

Multiply:

1. \$.50 by 2
2. \$.25 by 3
3. \$.40 by 4
4. \$.66 by 2
5. \$.34 by 3
6. \$.35 by 5
7. \$.56 by 6
8. \$.14 by 7
9. \$.10 by 8
10. \$.11 by 9
11. \$3.50 by 23
12. \$2.50 by 36
13. \$.75 by 54
14. \$.85 by 55
15. \$1.10 by 230
16. \$.75 by 135
17. \$1.15 by 185
18. \$.35 by 120
19. \$2.35 by 75
20. \$1.05 by 65
21. \$1.40 by 11
22. \$1.35 by 12
23. \$2.25 by 10
24. \$1.84 by 28
25. \$2.06 by 9
26. \$1.55 by 8
27. \$1.25 by 25
28. \$3.10 by 20
29. \$.68 by 15
30. \$4.45 by 30
31. \$6.45 by 30
32. \$.25 by 305
33. \$5.13 by 400
34. \$.86 by 45
35. \$.35 by 56
36. \$.75 by 65
37. \$8.39 by 100
38. \$.35 by 135
39. \$3.30 by 88
40. \$1.55 by 99
41. \$1.65 by 24
42. \$2.45 by 16
43. \$2.64 by 17
44. \$1.75 by 125
45. \$1.82 by 315
46. \$.75 by 29
47. \$2.42 by 213
48. \$3.05 by 175
49. \$.85 by 34
50. \$.37 by 25
51. \$3.24 by 530
52. \$2.30 by 175
53. \$1.29 by 110
54. \$1.98 by 89
55. \$2.25 by 115
56. \$4.62 by 435
57. \$3.15 by 50
58. \$.98 by 175
59. \$.39 by 250
60. \$.49 by 125

61. Find the cost of 314 school maps at \$7.35 apiece.

Divide and test your work by multiplication:

1. 168 ÷ 4	11. 8064 ÷ 4	21. 64,140 ÷ 12
2. 81 ÷ 9	12. 888 ÷ 12	22. 33,550 ÷ 11
3. 243 ÷ 9	13. 8470 ÷ 11	23. 80,316 ÷ 9
4. 175 ÷ 5	14. 7209 ÷ 9	24. 80,328 ÷ 8
5. 144 ÷ 12	15. 4096 ÷ 8	25. 49,763 ÷ 7
6. 288 ÷ 4	16. 1296 ÷ 6	26. 75,525 ÷ 5
7. 216 ÷ 6	17. 9987 ÷ 3	27. 72,840 ÷ 6
8. 639 ÷ 3	18. 6535 ÷ 5	28. 64,892 ÷ 4
9. 294 ÷ 7	19. 2401 ÷ 7	29. 11,984 ÷ 7
10. 512 ÷ 8	20. 7645 ÷ 11	30. 81,963 ÷ 9

Find the quotients of

31. 728 ÷ 8	41. 5,427 ÷ 9	51. 18,464 ÷ 4
32. 254 ÷ 9	42. 7,686 ÷ 6	52. 2,772 ÷ 11
33. 352 ÷ 11	43. 81,975 ÷ 5	53. 672 ÷ 12
34. 8,040 ÷ 12	44. 10,008 ÷ 11	54. 18,468 ÷ 9
35. 784 ÷ 7	45. 98,990 ÷ 10	55. 59,048 ÷ 8
36. 3,678 ÷ 6	46. 5,845 ÷ 7	56. 95,065 ÷ 5
37. 5,815 ÷ 5	47. 63,216 ÷ 4	57. 8,967 ÷ 7
38. 1,692 ÷ 4	48. 96,800 ÷ 12	58. 8,244 ÷ 6
39. 3,267 ÷ 3	49. 819,972 ÷ 9	59. 90,349 ÷ 7
40. 2,727 ÷ 9	50. 916,016 ÷ 8	60. 6,435 ÷ 9

61. A dozen baseballs cost $10.20. How much did one cost?

62. John earned $1.60 for picking cherries. He received eight cents a basket. How many baskets did he pick?

1. Mr. Clark sold seven sacks of potatoes for $8.05. How much did he receive for one sack?

$1.15 7)$8.05	The decimal point in the quotient is directly over the one in the dividend.

Divide and test your work by multiplication:

2. $3.48 ÷ 2	**11.** $9.44 ÷ 8	**20.** $83.40 ÷ 2
3. $8.96 ÷ 4	**12.** $8.96 ÷ 8	**21.** $74.67 ÷ 3
4. $4.25 ÷ 5	**13.** $23.04 ÷ 12	**22.** $65.32 ÷ 4
5. $6.36 ÷ 6	**14.** $35.88 ÷ 12	**23.** $83.55 ÷ 5
6. $8.46 ÷ 6	**15.** $49.12 ÷ 8	**24.** $63.78 ÷ 6
7. $14.34 ÷ 6	**16.** $9.81 ÷ 9	**25.** $39.69 ÷ 7
8. $12.04 ÷ 7	**17.** $10.35 ÷ 9	**26.** $48.64 ÷ 8
9. $13.23 ÷ 7	**18.** $15.21 ÷ 9	**27.** $37.53 ÷ 9
10. $9.45 ÷ 7	**19.** $47.34 ÷ 9	**28.** $9.09 ÷ 9

29. Five boys shared equally $1.25 which they received for removing the rubbish and weeds from a vacant lot. What was one boy's share?

30. It cost $4.14 a week to furnish gasoline for Mr. Ray's delivery truck. How much a day does it cost? (Six working days in a week.)

31. When 7 bushels of apples cost $12.25, what will one bushel cost?

32. When 12 bushels of potatoes cost $7.80, what will one bushel cost?

Problems

1. How many weeks are there in 10,416 days?

2. Mr. Smith set out 864 tomato plants in twelve rows. How many plants were set out in each row?

3. An automobile was driven 58,986 miles in six seasons. What was the average number of miles it was driven each season?

4. The Bellevue Boy Scouts numbering 12 camped at Fourth Lake, Inlet, New York. It cost $15 a day to feed the boys. How much a day did each boy pay?

5. Mrs. Dunn paid $137.50 for 11 tons of coal. How much did she pay for one ton?

6. The "T. R.'s" scored 207 points in 9 basketball games. What was the average number of points for a game?

7. Mr. Small bought 5292 sheets of paper. He divided the paper between twelve boys for school use. How many sheets did each boy receive?

8. Mrs. John bought 108 apples. How many dozen did she buy?

9. Theodore Roosevelt Junior High School had 1200 lockers. How many dozen lockers are there?

10. Seven girls each bought a new dress. The total cost of the dresses was $103.25. What was the average cost of a dress?

11. In a village school there are 450 pupils who are seated in nine rooms. What is the average number in a room?

1. Fifteen men share equally the expense of an excursion costing $90. What does each man pay?

$$\begin{array}{r} 6 \\ 15\overline{)90} \\ 90 \\ \hline \end{array}$$

The *number* of dollars each man pays is the quotient of 90 divided by 15, which is 6. Each man pays $6.

2. At $28 each how many suits of clothes must a merchant sell to receive $336?

$$\begin{array}{r} 12 \\ 28\overline{)336} \\ 28 \\ \hline 56 \\ 56 \\ \hline \end{array}$$

The *number* of suits he must sell is the quotient of 336 divided by 28, which is 12. He must sell 12 suits.

3. If a man pays $31 a month for rent, in how many months will he have paid $372?

4. How many suits at $39 each can a merchant buy for $9477?

5. How many chairs at $14 each can be bought for $8344?

6. If 69 pupils sell 3864 tickets, what is the average number for each pupil?

7. A class of thirty-two pupils saved $15.36 during the month of February. What was the average saving for each pupil?

8. A bushel of potatoes weighs 60 pounds. A carload of potatoes weighing 37,440 pounds contains how many bushels?

Divide 2268 by 21.

	Think how many 21's in 22?
	Write 1 in quotient.
108	Multiply 21 by 1.
21)2268	Subtract product from 22. Write remainder.
21	Bring down next figure.
168	Think how many 21's in 16?
	Write 0 in quotient.
168	Bring down next figure 8. Place with remainder 16.
	Think how many 21's in 168?
	Write 8 in quotient.
	Multiply and subtract.

Find quotients and test:

1. $23\overline{)2392}$	7. $2232 \div 62$	13. $13{,}760 \div 32$
2. $22\overline{)8932}$	8. $1488 \div 24$	14. $17{,}458 \div 43$
3. $31\overline{)1550}$	9. $7820 \div 23$	15. $12{,}768 \div 42$
4. $36\overline{)1440}$	10. $7360 \div 32$	16. $23{,}424 \div 32$
5. $24\overline{)7320}$	11. $1872 \div 24$	17. $13{,}431 \div 33$
6. $34\overline{)8228}$	12. $9706 \div 23$	18. $31{,}408 \div 52$

19. In 24 working days a bicycle factory put out 4656 bicycles. What was the average daily output?

20. Mr. Hare's automobile averaged 21 miles to the gallon of gasoline last season. He drove it 8568 miles. How many gallons did he use?

21. At an average of 32 pupils to a teacher how many teachers would be required for 9664 pupils?

22. How many tons of corn meal at $32 a ton may be bought for $928?

1. Mr. Cleveland bought 61 hats for $149.45. How much apiece did he pay?

$$
\begin{array}{r}
\$2.45 \\
61\overline{)\$149.45} \\
\underline{122} \\
274 \\
\underline{244} \\
305 \\
\underline{305}
\end{array}
$$

To find the quotient figure, say, "6 in 14," "6 in 27," "6 in 30."

Memorize the following steps:

1. Quotient figure,
2. Multiply,
3. Subtract,
4. Bring down.

The decimal point in the quotient is directly above the one in the dividend.

Find the quotient:

2. 69,615 ÷ 91	8. 5566 ÷ 22	14. 11,704 ÷ 22
3. 14,190 ÷ 22	9. 8382 ÷ 22	15. 13,568 ÷ 32
4. 23,424 ÷ 32	10. 23,424 ÷ 32	16. 26,976 ÷ 32
5. 30,528 ÷ 32	11. 7520 ÷ 32	17. 23,008 ÷ 32
6. 22,722 ÷ 42	12. 27,384 ÷ 42	18. 32,046 ÷ 42
7. 12,168 ÷ 52	13. 17,940 ÷ 52	19. 48,246 ÷ 62

20. Mr. Jones sold 35 tons of hay for $560. What did he get for a ton?

21. Mr. Smith gathered 1344 bu. of corn from 42 acres of land. How many bushels did an acre yield?

22. If a family's expenses are $114.60 for a month of 30 days, what is the average daily expense?

23. Mr. Abrams earns $2496 in one year (52 weeks). What does he earn in one week?

Division may be indicated in these four ways.

$38 \div 9$. $9\overline{)38}$. $\frac{38}{9}$. $\frac{1}{9}$ of 38.

The remainder may be written in the quotient in the form of a fraction.

$38 \div 9 = 4\frac{2}{9}$. $9\overline{)38}$ $4\frac{2}{9}$

Find the quotients:

1. 22,196 ÷ 62	2. 58,608 ÷ 72	3. 8,208 ÷ 62
4. 30,750 ÷ 82	5. 59,708 ÷ 92	6. 25,560 ÷ 72
7. 60,912 ÷ 72	8. 48,024 ÷ 72	9. 59,286 ÷ 82
10. 29,356 ÷ 82	11. 39,442 ÷ 82	12. 65,518 ÷ 82

13. $\frac{27938}{57}$	19. $\frac{6294}{83}$	25. $\frac{7209}{18}$	31. $\frac{6420}{42}$
14. $\frac{7483}{56}$	20. $\frac{18736}{54}$	26. $\frac{56803}{92}$	32. $\frac{9063}{50}$
15. $\frac{6284}{59}$	21. $\frac{92307}{36}$	27. $\frac{53124}{72}$	33. $\frac{9650}{87}$
16. $\frac{6004}{29}$	22. $\frac{37561}{46}$	28. $\frac{25964}{38}$	34. $\frac{8329}{31}$
17. $\frac{40136}{24}$	23. $\frac{50601}{87}$	29. $\frac{80319}{75}$	35. $\frac{29006}{27}$
18. $\frac{57764}{28}$	24. $\frac{14245}{35}$	30. $\frac{71500}{69}$	36. $\frac{11988}{14}$

37. $\frac{64188}{33}$	39. $\frac{41213}{13}$	41. $\frac{5681}{15}$
38. $\frac{31053}{65}$	40. $\frac{888}{12}$	42. $\frac{27685}{16}$
43. $83\overline{)2066}$	45. $83\overline{)7644}$	47. $83\overline{)2954}$
44. $83\overline{)1643}$	46. $93\overline{)6742}$	48. $93\overline{)6110}$

Mental Test

1. Mary has 48¢ and Harry ¼ as much. How much has he?
2. How much will 9 pineapples cost at 11¢ apiece?
3. In 60 feet, there are how many yards?
4. \$1.00 − 20¢ = ?
5. 36 + 5 + 2 + 3 + 6 + 4 + 7 = ?

$$\begin{array}{r} 55 \\ 125\overline{)6895} \\ 625 \\ \hline 645 \\ 625 \\ \hline 20 \end{array} \qquad \begin{array}{r} 125 \\ 55 \\ \hline 625 \\ 625 \\ \hline 6875 \\ 20 \\ \hline 6895 \end{array}$$

Test. $55 \times 125 + 20 = 6895$

Quotient × Divisor + Remainder = Dividend.

Divide and test:

1. $2442 \div 138$
2. $1695 \div 113$
3. $1464 \div 122$
4. $3100 \div 124$
5. $3690 \div 130$
6. $2240 \div 112$
7. $2090 \div 110$
8. $3232 \div 202$
9. $7140 \div 210$
10. $3655 \div 215$
11. $114\overline{)2662}$
12. $120\overline{)1780}$
13. $131\overline{)1441}$
14. $140\overline{)3220}$
15. $141\overline{)3948}$
16. $234\overline{)3690}$
17. $211\overline{)6752}$
18. $220\overline{)5280}$
19. $230\overline{)8280}$
20. $151\overline{)4681}$
21. $\frac{2541}{121}$
22. $\frac{1848}{132}$
23. $\frac{7437}{201}$
24. $\frac{5508}{204}$
25. $\frac{3408}{213}$
26. $\frac{4176}{232}$
27. $\frac{8750}{525}$
28. $\frac{7714}{203}$
29. $\frac{4240}{212}$
30. $\frac{8541}{231}$

Supply the missing factor:

31. $19 \times ? = 76$
32. $23 \times ? = 138$
33. $36 \times ? = 180$
34. $30 \times ? = 210$
35. $24 \times ? = 192$
36. $42 \times ? = 84$
37. $41 \times ? = 369$
38. $29 \times ? = 87$
39. $31 \times ? = 310$
40. $20 \times ? = 220$
41. $35 \times ? = 315$
42. $26 \times ? = 208$

Problems

1. Divide \$27.30 equally among 7 men. How much will each receive?

2. When I pay \$157.50 for 14 tons of coal, what is the price for a ton?

3. A clothier paid \$253.68 for 14 overcoats. How much did he pay for each?

4. A tenant pays rent amounting to \$539.70 in 21 months. How much does he pay for a month?

5. I sold 41 barrels of apples for \$278.80. What did I receive for a barrel?

6. A farmer sells 71 tons of hay for \$852. What is the selling price of a ton?

7. Jack earned \$11.25 in 15 days. How much did he earn in one day?

8. An agent's expense amounts to \$42 a week. In how many weeks will his expenses amount to \$882?

9. Make a problem, using 39 for divisor and \$585 for dividend.

10. If 110 uniforms cost \$2640, what was the cost of one uniform?

11. A merchant sells 72 hats for \$134.64. How much does he receive for each?

12. If a regiment of 1152 soldiers march in lines of 24 men each, there will be how many lines?

13. John and his father went on a trip of 1134 miles in their motor launch. If they traveled 54 miles a day, how many days did it take them to travel the 1134 miles?

Fractions

1. Draw a line. Divide it into two equal parts. What is each part called? Write *one half* thus: $\frac{1}{2}$.

2. Draw a line and divide it into four equal parts. What is each part called? How many fourths are there in $\frac{1}{2}$ of the line?

3. An orange is divided equally among four boys. What part does each receive? Write *one fourth* thus: $\frac{1}{4}$.

4. If a cake were cut into eight equal parts, what would each part be called? How would you write *one eighth?*

5. Divide a line into eight equal parts. $\frac{1}{2}$ of the line is how many eighths? $\frac{1}{4}$ of the line?

6. A pear is divided equally among three children. What part does each receive? Write *one third.*

7. If a melon is divided into five equal parts, what is one part called? Two parts? Write *two fifths* thus: $\frac{2}{5}$.

8. There are seven days in a week. What part of a week is one day? Three days? How will you write *three sevenths?*

Numbers smaller than 1 *are expressed by means of fractions.*

$\frac{2}{7}$ is a fraction.
2 and 7 are the **terms** of the fraction $\frac{2}{7}$.
2, *the term above the line,* is the **numerator.**
7, *the term below the line,* is the **denominator.**

Write the following fractions:

1. 1 half; 1 third; 1 fourth; 1 ninth; 1 tenth.
2. 2 thirds; 3 fifths; 2 sevenths; 3 tenths; 5 ninths.
3. 5 fourteenths; 3 sixteenths; 4 twenty-firsts.
4. 5 sixteenths; 7 twenty-seconds.
5. Five eighths; four sevenths; two ninths.
6. Eight twenty-firsts; four twenty-thirds.

Read these fractions:

7. $\frac{1}{8}$; $\frac{2}{11}$; $\frac{3}{15}$; $\frac{9}{10}$; $\frac{4}{5}$; $\frac{1}{7}$; $\frac{11}{12}$; $\frac{5}{9}$.
8. $\frac{3}{5}$; $\frac{15}{16}$; $\frac{5}{18}$; $\frac{2}{3}$; $\frac{7}{8}$; $\frac{1}{21}$; $\frac{5}{21}$; $\frac{10}{21}$.
9. $\frac{3}{4}$; $\frac{5}{8}$; $\frac{3}{7}$; $\frac{4}{21}$; $\frac{8}{21}$; $\frac{9}{22}$; $\frac{12}{22}$; $\frac{15}{23}$.
10. Name the numerators in exercise 7.
11. Name the denominators in exercise 9.

$3\frac{1}{2}$ is read *three and one half.*
It is a **mixed number,** being formed of a *whole number* and a *fraction.*

Write:

12. Four and two thirds; seven and one half.
13. Five and three eighths; nine and four fifths.

Read:

14. $6\frac{7}{8}$. 15. $3\frac{9}{10}$. 16. $7\frac{5}{8}$. 17. $11\frac{4}{5}$. 18. $15\frac{1}{3}$. 19. $9\frac{1}{2}$. 20. $8\frac{3}{7}$. 21. $21\frac{1}{3}$. 22. $3\frac{1}{9}$. 23. $7\frac{1}{21}$.

Add $\frac{1}{4}$ and $\frac{1}{4}$ and $\frac{1}{4}$.

One fourth + one fourth + one fourth = three fourths.

$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4}$

1. $\frac{1}{4} + \frac{1}{4} = ?$
2. $\frac{1}{8} + \frac{1}{8} + \frac{1}{8} = ?$
3. $\frac{1}{8} + \frac{1}{8} = ?$
4. $\frac{1}{2} + \frac{1}{2} = ?$
5. $\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} = ?$
6. $\frac{1}{8} + \frac{3}{8} = ?$
7. $\frac{3}{8} + \frac{1}{8} + \frac{1}{8} = ?$
8. $\frac{3}{8} + \frac{3}{8} = ?$
9. $\frac{5}{8} + \frac{1}{8} + \frac{1}{8} = ?$
10. $\frac{1}{8} + \frac{1}{8} + \frac{3}{8} + \frac{1}{8} = ?$
11. $\frac{2}{8} + \frac{3}{8} = ?$
12. $\frac{1}{4} + \frac{2}{4} + \frac{1}{4} = ?$
13. $\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} = ?$
14. $\frac{2}{8} + \frac{3}{8} + \frac{1}{8} + \frac{1}{8} = ?$
15. $\frac{4}{8} + \frac{1}{8} + \frac{1}{8} = ?$
16. $\frac{1}{8} + \frac{2}{8} + \frac{1}{8} + \frac{2}{8} = ?$
17. $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} = ?$
18. $\frac{3}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} = ?$

Add $2\frac{1}{8}$ and $3\frac{2}{8}$.

$\frac{1}{8} + \frac{2}{8} = \frac{3}{8}$ Add fractions first.

$2\frac{1}{8} + 3\frac{2}{8} = 5\frac{3}{8}$

19. $3\frac{1}{8} + 2\frac{1}{8} = ?$
20. $5\frac{1}{4} + 3\frac{1}{4} = ?$
21. $2\frac{1}{2} + 7 = ?$
22. $1\frac{1}{2} + 1\frac{1}{2} = ?$
23. $4\frac{1}{8} + \frac{1}{8} + 3\frac{1}{8} = ?$
24. $3\frac{3}{8} + 2\frac{1}{8} + 5\frac{1}{8} = ?$
25. $4\frac{1}{4} + \frac{1}{4} + 3 = ?$
26. $6\frac{7}{8} + 3 + 5 = ?$
27. $5\frac{1}{4} + 2\frac{1}{4} + \frac{1}{4} = ?$
28. $3\frac{3}{8} + \frac{1}{8} + \frac{1}{8} + 7\frac{1}{8} = ?$
29. $4\frac{1}{2} + 2 + 7 + 9 = ?$
30. $5 + 2\frac{1}{8} + 3 + 4\frac{3}{8} = ?$
31. $\frac{1}{8} + \frac{3}{8} + 3 + 2\frac{1}{8} = ?$
32. $5\frac{1}{8} + 4\frac{3}{8} + 5 + \frac{1}{8} = ?$
33. $3 + 6\frac{1}{2} + 7 + 2 = ?$
34. $4\frac{1}{4} + 7 + 3\frac{1}{4} + 2\frac{1}{4} = ?$

1. $3\frac{1}{5} + 2\frac{1}{5} + \frac{2}{5} = ?$
2. $1\frac{3}{5} + \frac{1}{5} + 2 = ?$
3. $\frac{4}{5} + 6 + 7 + \frac{1}{5} = ?$
4. $\frac{4}{5} - \frac{2}{5} = ?$
5. $\frac{3}{5} - \frac{2}{5} = ?$
6. $1\frac{3}{5} - 1\frac{1}{5} = ?$
7. $7\frac{3}{5} + 2\frac{1}{5} + 7 = ?$
8. $3\frac{2}{5} + 6\frac{2}{5} + 5 = ?$
9. $6\frac{1}{5} + 2\frac{1}{5} + 4\frac{2}{5} = ?$
10. $7\frac{3}{5} - 4\frac{1}{5} = ?$
11. $6\frac{4}{5} - 2\frac{2}{5} = ?$
12. $5\frac{2}{5} - 3\frac{1}{5} = ?$
13. $9\frac{3}{5} - 4\frac{1}{5} = ?$
14. $8\frac{2}{5} - 4\frac{2}{5} = ?$
15. $6\frac{3}{5} - 2\frac{3}{5} = ?$
16. $5\frac{4}{5} - 1\frac{3}{5} = ?$
17. $13\frac{2}{5} - 6\frac{1}{5} = ?$
18. $12\frac{2}{5} + 8\frac{1}{5} = ?$
19. $3\frac{3}{10} + 6\frac{1}{10} + 5\frac{1}{10} + \frac{1}{10} = ?$
20. $\frac{1}{10} + \frac{3}{10} + 2\frac{5}{10} = ?$
21. $4\frac{3}{10} + 2\frac{1}{10} + 1\frac{3}{10} = ?$
22. $3\frac{1}{10} + 5\frac{1}{10} + 4\frac{1}{10} = ?$
23. $4\frac{7}{10} + 10 + 5\frac{1}{10} + \frac{1}{10} = ?$
24. $\frac{5}{10} + \frac{3}{10} + \frac{2}{10} = ?$
25. $\frac{8}{10} - \frac{5}{10} = ?$
26. $\frac{2}{10} - \frac{2}{10} = ?$
27. $3\frac{3}{10} - 2\frac{1}{10} = ?$
28. $6\frac{5}{10} - 2\frac{3}{10} = ?$
29. $6\frac{1}{10} + 3\frac{1}{10} + 5\frac{3}{10} = ?$
30. $7 + 4 + 2\frac{3}{10} + \frac{2}{10} = ?$
31. $\frac{1}{10} + \frac{3}{10} + 3\frac{5}{10} + 8 = ?$
32. $12 + \frac{4}{10} + 1\frac{1}{10} + 3\frac{1}{10} = ?$
33. $9\frac{3}{10} - \frac{1}{10} = ?$
34. $5\frac{5}{10} - 2\frac{2}{10} = ?$
35. $6\frac{4}{10} - 1\frac{1}{10} = ?$
36. $3\frac{7}{10} - \frac{4}{10} = ?$
37. $\frac{3}{10} + \frac{1}{10} + \frac{1}{10} + 1\frac{2}{10} + \frac{2}{10} = ?$
38. $\frac{1}{10} + \frac{2}{10} + \frac{3}{10} + 2\frac{1}{10} + 4\frac{1}{10} = ?$
39. $4\frac{1}{3} + 5\frac{1}{3} = ?$
40. $6\frac{1}{2} + 3\frac{1}{2} = ?$
41. $2\frac{1}{4} + 3\frac{3}{4} = ?$
42. $1\frac{1}{7} + 4\frac{5}{7} = ?$
43. $9\frac{3}{8} + 7\frac{3}{8} = ?$
44. $4\frac{1}{6} + 9\frac{1}{6} = ?$
45. $2\frac{3}{7} + 4\frac{3}{7} = ?$
46. $8\frac{1}{10} + 3\frac{1}{10} = ?$
47. $1\frac{1}{4} + 8\frac{1}{4} = ?$
48. $15\frac{1}{6} + 7\frac{1}{6} = ?$
49. $11\frac{5}{9} + 2\frac{5}{9} = ?$
50. $6\frac{1}{9} + 7\frac{4}{9} = ?$

Least Common Multiple

Find the Least Common Multiple of 9 and 12.

Is 9 contained an exact number of times in 12? No.
Is 9 contained an exact number of times in 2×12? No.
Is 9 contained an exact number of times in 3×12? Yes.
Therefore 3×12, or 36, is the Least Common Multiple.

Find the Least Common Multiple of the following numbers:

1. 2, 3	16. 4, 5	31. 7, 5	46. 20, 5
2. 2, 5	17. 4, 12	32. 6, 12	47. 20, 10
3. 2, 6	18. 4, 6	33. 6, 8	48. 12, 16
4. 2, 4	19. 9, 4	34. 6, 11	49. 30, 5
5. 2, 7	20. 8, 4	35. 10, 6	50. 20, 30
6. 2, 8	21. 7, 4	36. 7, 6	51. 10, 30
7. 9, 2	22. 11, 4	37. 9, 6	52. 15, 30
8. 10, 2	23. 4, 10	38. 8, 12	53. 20, 15
9. 12, 2	24. 5, 3	39. 12, 9	54. 14, 21
10. 4, 3	25. 5, 6	40. 12, 5	55. 16, 20
11. 12, 3	26. 5, 12	41. 12, 3	56. 25, 20
12. 6, 3	27. 5, 9	42. 12, 6	57. 50, 10
13. 9, 3	28. 5, 11	43. 7, 12	58. 60, 15
14. 8, 3	29. 10, 5	44. 7, 9	59. 75, 25
15. 7, 3	30. 8, 5	45. 15, 5	60. 30, 6

61. In what multiple of 6 is 5 contained an exact number of times?

62. In what multiple of 5 is 6 contained an exact number of times?

63. What is the L. C. M. of 6 and 5, of 5 and 6?

Find the Least Common Multiple of 2, 3, 5.

Is 2 contained an even number of times in 5? In 10? In 15? In 20? In 25? In 30?

Is 3 contained an even number of times in 5? In 10? In 15? In 20? In 25? In 30?

Are 2 and 3 both contained an even number of times in 10? In 15? In 20? In 30?

Thirty is therefore the smallest number that will contain both 2, 3, and 5.

Find the Least Common Multiple of the following numbers:

1. 2, 4, 5	**11.** 6, 9, 12	**21.** 16, 4, 8
2. 3, 6, 5	**12.** 4, 8, 6	**22.** 25, 5, 10
3. 2, 6, 5	**13.** 5, 10, 2	**23.** 18, 6, 3
4. 3, 6, 9	**14.** 5, 15, 3	**24.** 21, 7, 14
5. 3, 9, 12	**15.** 2, 8, 6	**25.** 9, 18, 2
6. 4, 8, 12	**16.** 6, 12, 15	**26.** 18, 2, 3
7. 2, 4, 8	**17.** 5, 10, 15	**27.** 12, 2, 3
8. 2, 8, 12	**18.** 7, 14, 2	**28.** 18, 12, 6
9. 6, 8, 12	**19.** 7, 21, 3	**29.** 18, 9, 3
10. 6, 2, 8	**20.** 2, 21, 3	**30.** 15, 25, 5

31. What is the smallest number that will exactly contain 5 and 7?

32. What is the smallest number that is exactly divisible by 3, 6, and 9?

33. Find the smallest number that will contain 5, 8, and 10 an even number of times.

Fractions with the same denominator are said to have a *Common Denominator.*

The smallest denominator that two or more fractions can have is their *Least Common Denominator.*

Reduce $\frac{3}{4}$ and $\frac{2}{3}$ to fractions having their Least Common Denominator.

Is 3 contained an exact number of times in 4?
Is 3 contained an exact number of times in 8?
Is 3 contained an exact number of times in 12?

Therefore 12 is the least common denominator. The least common denominator is the same as the L. C. M. of the denominator.

$\frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12}$ Say "4 in 12 three times, therefore multiply both terms of the fraction $\frac{3}{4}$ by *three.*"

$\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$ Say "3 in 12 four times, therefore multiply both terms of the fraction $\frac{2}{3}$ by *four.*"

Change the following fractions to fractions having the least common denominator:

1. $\frac{1}{2}, \frac{1}{3}$	11. $\frac{1}{3}, \frac{1}{4}$	21. $\frac{1}{4}, \frac{1}{6}$	31. $\frac{1}{6}, \frac{1}{12}$
2. $\frac{1}{2}, \frac{1}{4}$	12. $\frac{1}{3}, \frac{3}{4}$	22. $\frac{5}{6}, \frac{3}{4}$	32. $\frac{5}{6}, \frac{7}{12}$
3. $\frac{1}{2}, \frac{1}{6}$	13. $\frac{1}{3}, \frac{1}{6}$	23. $\frac{3}{4}, \frac{3}{8}$	33. $\frac{5}{6}, \frac{7}{9}$
4. $\frac{1}{8}, \frac{1}{2}$	14. $\frac{5}{6}, \frac{1}{3}$	24. $\frac{1}{4}, \frac{5}{8}$	34. $\frac{1}{6}, \frac{5}{9}$
5. $\frac{1}{12}, \frac{1}{2}$	15. $\frac{1}{3}, \frac{2}{9}$	25. $\frac{1}{4}, \frac{5}{12}$	35. $\frac{5}{9}, \frac{5}{6}$
6. $\frac{2}{3}, \frac{1}{2}$	16. $\frac{1}{3}, \frac{5}{9}$	26. $\frac{3}{4}, \frac{7}{12}$	36. $\frac{1}{9}, \frac{1}{12}$
7. $\frac{3}{4}, \frac{1}{2}$	17. $\frac{7}{12}, \frac{1}{3}$	27. $\frac{3}{4}, \frac{1}{9}$	37. $\frac{5}{9}, \frac{5}{12}$
8. $\frac{5}{6}, \frac{1}{2}$	18. $\frac{11}{12}, \frac{2}{3}$	28. $\frac{3}{4}, \frac{5}{9}$	38. $\frac{11}{12}, \frac{5}{6}$
9. $\frac{1}{2}, \frac{3}{8}$	19. $\frac{7}{9}, \frac{2}{3}$	29. $\frac{1}{4}, \frac{5}{6}$	39. $\frac{1}{7}, \frac{2}{3}$
10. $\frac{1}{2}, \frac{5}{12}$	20. $\frac{5}{12}, \frac{2}{3}$	30. $\frac{3}{4}, \frac{11}{12}$	40. $\frac{1}{7}, \frac{2}{5}$

Add $\frac{1}{4}$ and $\frac{3}{5}$.

$\frac{1}{4} = \frac{5}{20}$

$\frac{3}{5} = \frac{12}{20}$

$\frac{17}{20}$ *Sum*

Fractions, to be added, must be given a common denominator.

In adding $\frac{1}{4}$ and $\frac{3}{5}$, first find their least common denominator, which is 20.

Now change $\frac{1}{4}$ and $\frac{3}{5}$ to twentieths.

Then say "5 twentieths and 12 twentieths are 17 twentieths."

Add:

1. $\frac{1}{2}$ and $\frac{1}{3}$
2. $\frac{1}{4}$ and $\frac{1}{3}$
3. $\frac{1}{5}$ and $\frac{1}{2}$
4. $\frac{1}{7}$ and $\frac{1}{3}$
5. $\frac{1}{5}$ and $\frac{1}{3}$
6. $\frac{2}{9}$ and $\frac{1}{3}$
7. $\frac{2}{5}$ and $\frac{1}{3}$
8. $\frac{1}{2}$ and $\frac{1}{8}$
9. $\frac{1}{4}$ and $\frac{2}{3}$
10. $\frac{1}{12}$ and $\frac{3}{4}$
11. $\frac{1}{12}$ and $\frac{1}{6}$
12. $\frac{3}{7}$ and $\frac{1}{3}$

2 is expressed in its simplest form, for it is an integer.

$\frac{3}{5}$ is expressed in its simplest form, for it is a proper fraction in its lowest terms.

$2\frac{1}{2}$ is expressed in its simplest form, for it is a mixed number whose fractional part is in its lowest terms.

Reduce the following to their simplest form. Tell why your result is in its simplest form.

1. $\frac{5}{5}$
2. $\frac{6}{6}$
3. $\frac{7}{14}$
4. $\frac{4}{12}$
5. $\frac{2}{8}$
6. $\frac{3}{9}$
7. $\frac{4}{16}$
8. $\frac{3}{12}$
9. $\frac{15}{30}$
10. $\frac{6}{30}$
11. $\frac{5}{10}$
12. $\frac{3}{3}$
13. $\frac{14}{21}$
14. $\frac{3}{4}$
15. $\frac{10}{8}$
16. $\frac{5}{9}$
17. $\frac{20}{16}$
18. $\frac{3}{20}$
19. $\frac{20}{30}$
20. $\frac{35}{7}$
21. $\frac{5}{15}$
22. $\frac{9}{3}$
23. $\frac{21}{14}$
24. $\frac{9}{12}$
25. $\frac{16}{8}$
26. $\frac{8}{2}$
27. $\frac{9}{16}$
28. $\frac{12}{20}$
29. $\frac{60}{30}$
30. $\frac{11}{22}$
31. $\frac{15}{5}$
32. $\frac{10}{3}$
33. $\frac{7}{7}$
34. $\frac{16}{12}$
35. $\frac{7}{8}$
36. $\frac{2}{3}$
37. $\frac{12}{16}$
38. $\frac{10}{20}$
39. $\frac{3}{30}$
40. $\frac{9}{18}$

Add the following fractions and reduce the sums to simplest form. Tell why your result is in its simplest form.

1. $\frac{1}{2}, \frac{4}{5}$
2. $\frac{1}{3}, \frac{2}{3}$
3. $\frac{4}{5}, \frac{1}{4}$
4. $\frac{5}{6}, \frac{1}{5}$
5. $\frac{1}{7}, \frac{13}{14}$
6. $\frac{3}{8}, \frac{3}{4}$
7. $\frac{5}{9}, \frac{5}{18}$
8. $\frac{2}{7}, \frac{3}{5}$
9. $\frac{9}{10}, \frac{2}{5}$
10. $\frac{14}{15}, \frac{4}{5}$
11. $\frac{1}{2}, \frac{5}{6}$
12. $\frac{1}{3}, \frac{5}{6}$
13. $\frac{7}{8}, \frac{3}{4}$
14. $\frac{5}{8}, \frac{3}{5}$
15. $\frac{6}{14}, \frac{3}{7}$
16. $\frac{7}{8}, \frac{5}{24}$
17. $\frac{2}{3}, \frac{7}{9}$
18. $\frac{2}{3}, \frac{5}{12}$
19. $\frac{11}{20}, \frac{3}{4}$
20. $\frac{5}{18}, \frac{2}{9}$
21. $\frac{1}{2}, \frac{7}{12}$
22. $\frac{7}{9}, \frac{2}{3}$
23. $\frac{3}{8}, \frac{3}{4}$
24. $\frac{9}{10}, \frac{4}{5}$
25. $\frac{4}{5}, \frac{5}{7}$
26. $\frac{5}{8}, \frac{15}{16}$
27. $\frac{8}{14}, \frac{4}{7}$
28. $\frac{6}{7}, \frac{2}{14}$
29. $\frac{3}{10}, \frac{4}{5}$
30. $\frac{5}{12}, \frac{5}{6}$

Add: $\frac{5}{6} = \frac{15}{18}$
$\frac{8}{9} = \frac{16}{18}$
$\frac{29}{18} = 1\frac{11}{18}$ *Sum*

Add: $\frac{9}{10} = \frac{9}{10}$
$\frac{3}{5} = \frac{6}{10}$
$\frac{15}{10} = 1\frac{5}{10}$ or $1\frac{1}{2}$ *Sum*

Add: Reduce the answers to their simplest form:

1. $\frac{5}{8}$ / $\frac{3}{4}$
2. $\frac{10}{11}$ / $\frac{19}{22}$
3. $\frac{7}{12}$ / $\frac{1}{6}$
4. $\frac{19}{25}$ / $\frac{4}{5}$
5. $\frac{7}{8}$ / $\frac{10}{11}$
6. $\frac{11}{12}$ / $\frac{5}{6}$
7. $\frac{7}{15}$ / $\frac{2}{3}$
8. $\frac{23}{24}$ / $\frac{3}{4}$
9. $\frac{2}{3}$ / $\frac{6}{7}$
10. $\frac{4}{5}$ / $\frac{9}{11}$
11. $\frac{4}{5}$ / $\frac{9}{10}$
12. $\frac{8}{9}$ / $\frac{17}{18}$
13. $\frac{17}{24}$ / $\frac{5}{6}$
14. $\frac{3}{4}$ / $\frac{5}{7}$
15. $\frac{1}{2}$ / $\frac{13}{14}$

Find the sum of $3\frac{1}{3}$ and $4\frac{4}{5}$.

$3\frac{1}{3} = 3\frac{5}{15}$
$4\frac{4}{5} = 4\frac{12}{15}$
$7\frac{17}{15} = 8\frac{2}{15}$ *Sum*

Least Common Multiple of 3 and 5 is 15. Therefore, 15 is the least common denominator.

Add: Reduce each answer to its simplest form:

1. $2\frac{2}{3}$	2. $8\frac{1}{7}$	3. $6\frac{4}{5}$	4. $5\frac{1}{5}$	5. $12\frac{11}{12}$
$5\frac{5}{6}$	$9\frac{1}{2}$	$8\frac{1}{2}$	$4\frac{7}{10}$	$7\frac{2}{3}$
6. $3\frac{5}{7}$	7. $4\frac{1}{3}$	8. $12\frac{6}{7}$	9. $11\frac{3}{5}$	10. $8\frac{1}{2}$
$8\frac{13}{14}$	$7\frac{5}{12}$	$3\frac{1}{3}$	$2\frac{2}{7}$	$4\frac{5}{8}$
11. $9\frac{3}{4}$	12. $16\frac{1}{5}$	13. $9\frac{2}{3}$	14. $16\frac{3}{7}$	15. $10\frac{3}{8}$
$2\frac{9}{10}$	$7\frac{9}{10}$	$8\frac{5}{9}$	$5\frac{1}{2}$	$5\frac{3}{4}$
16. $4\frac{1}{2}$	17. $8\frac{1}{4}$	18. $12\frac{1}{5}$	19. $5\frac{1}{3}$	20. $21\frac{2}{7}$
$1\frac{2}{3}$	$4\frac{3}{10}$	$8\frac{7}{10}$	$7\frac{14}{15}$	$11\frac{3}{14}$

How many examples can you solve in five minutes:

21. $7\frac{3}{16}$	22. $13\frac{1}{9}$	23. $7\frac{3}{4}$	24. $5\frac{5}{12}$	25. $8\frac{1}{3}$
$5\frac{1}{2}$	$5\frac{5}{9}$	$8\frac{7}{10}$	$1\frac{2}{3}$	$12\frac{1}{2}$
26. $10\frac{1}{2}$	27. $8\frac{1}{4}$	28. $12\frac{1}{3}$	29. $13\frac{1}{4}$	30. $13\frac{7}{8}$
$3\frac{15}{16}$	$5\frac{1}{2}$	$6\frac{5}{6}$	$16\frac{19}{20}$	$7\frac{1}{2}$
31. $3\frac{5}{12}$	32. $3\frac{5}{8}$	33. $6\frac{5}{9}$	34. $5\frac{3}{8}$	35. $4\frac{1}{4}$
$7\frac{1}{8}$	$4\frac{1}{2}$	$10\frac{1}{3}$	$12\frac{2}{5}$	$9\frac{7}{8}$
36. $4\frac{1}{2}$	37. $8\frac{3}{4}$	38. $11\frac{2}{3}$	39. $2\frac{11}{12}$	40. $9\frac{1}{8}$
$10\frac{1}{10}$	$2\frac{4}{5}$	$4\frac{7}{9}$	$6\frac{1}{3}$	$11\frac{15}{16}$

NOTE. — Pages 255 to 270 are *optional.*

Fractions, to be subtracted, must be given a common denominator.

$\frac{4}{5} - \frac{3}{10} = ?$

$\frac{4}{5} = \frac{8}{10}$

$\frac{3}{10} = \frac{3}{10}$

$\frac{5}{10} = \frac{1}{2}$ *Difference*

Say, "3 tenths and 5 tenths (writing $\frac{5}{10}$) are 8 tenths."

Test: $\frac{5}{10} + \frac{3}{10} = \frac{8}{10}$ $\frac{8}{10} = \frac{4}{5}$

Find the difference and test:

1. $\frac{4}{5}$ $\frac{3}{5}$	2. $\frac{4}{7}$ $\frac{3}{7}$	3. $\frac{8}{9}$ $\frac{5}{9}$	4. $\frac{5}{6}$ $\frac{1}{6}$	5. $\frac{2}{3}$ $\frac{1}{3}$
6. $\frac{5}{6}$ $\frac{1}{3}$	7. $\frac{5}{8}$ $\frac{1}{4}$	8. $\frac{7}{8}$ $\frac{1}{2}$	9. $\frac{3}{10}$ $\frac{2}{5}$	10. $\frac{5}{8}$ $\frac{1}{2}$
11. $\frac{1}{2}$ $\frac{1}{4}$	12. $\frac{1}{2}$ $\frac{1}{3}$	13. $\frac{2}{3}$ $\frac{1}{6}$	14. $\frac{3}{4}$ $\frac{1}{3}$	15. $\frac{3}{4}$ $\frac{1}{2}$
16. $\frac{11}{12}$ $\frac{1}{2}$	17. $\frac{7}{12}$ $\frac{1}{3}$	18. $\frac{5}{12}$ $\frac{1}{4}$	19. $\frac{11}{12}$ $\frac{5}{6}$	20. $\frac{7}{12}$ $\frac{1}{6}$

How many examples can you solve in two minutes?

21. $\frac{3}{4}$ $\frac{1}{4}$	22. $\frac{5}{6}$ $\frac{1}{6}$	23. $\frac{7}{8}$ $\frac{5}{8}$	24. $\frac{8}{9}$ $\frac{5}{9}$	25. $\frac{11}{12}$ $\frac{5}{12}$
26. $\frac{14}{15}$ $\frac{7}{15}$	27. $\frac{7}{15}$ $\frac{1}{15}$	28. $\frac{8}{11}$ $\frac{3}{11}$	29. $\frac{9}{10}$ $\frac{1}{5}$	30. $\frac{3}{4}$ $\frac{6}{8}$
31. $\frac{7}{8}$ $\frac{1}{2}$	32. $\frac{14}{16}$ $\frac{7}{8}$	33. $\frac{5}{8}$ $\frac{1}{2}$	34. $\frac{11}{12}$ $\frac{3}{4}$	35. $\frac{7}{12}$ $\frac{1}{4}$

$5\frac{3}{4} = 5\frac{3}{4}$
$3\frac{1}{2} = 3\frac{2}{4}$
$2\frac{1}{4}$ *Difference*

Say "2 fourths and one fourth (writing $\frac{1}{4}$) are three fourths. Three and 2 (writing 2) are 5."

Test: $2\frac{1}{4} + 3\frac{2}{4} = 5\frac{3}{4}$

Subtract and test:

1. $6\frac{2}{3} - 2\frac{1}{3}$
2. $7\frac{3}{4} - 2\frac{1}{2}$
3. $9\frac{3}{7} - 4\frac{1}{7}$
4. $5\frac{7}{9} - 1\frac{1}{3}$
5. $8\frac{3}{10} - 4\frac{1}{5}$
6. $6\frac{7}{8} - 2\frac{1}{2}$
7. $11\frac{4}{5} - 2\frac{1}{10}$
8. $6\frac{3}{4} - 2\frac{3}{8}$
9. $12\frac{11}{12} - 4\frac{4}{12}$
10. $4\frac{9}{10} - 2\frac{3}{5}$
11. $8\frac{3}{5} - 5\frac{1}{5}$
12. $7\frac{4}{7} - 6\frac{3}{7}$
13. $7\frac{4}{5} - 2\frac{1}{5}$
14. $10\frac{5}{6} - 7\frac{1}{3}$
15. $12\frac{3}{7} - 8\frac{2}{7}$
16. $5\frac{4}{5} - 2\frac{3}{10}$
17. $9\frac{7}{10} - 8\frac{1}{5}$
18. $8\frac{5}{8} - 6\frac{1}{4}$
19. $12\frac{3}{4} - 7\frac{1}{2}$
20. $10\frac{5}{6} - 5\frac{2}{3}$
21. $2\frac{7}{10} - 1\frac{3}{10}$
22. $6\frac{5}{6} - 5\frac{1}{6}$
23. $5\frac{4}{5} - 3\frac{3}{5}$
24. $12\frac{2}{7} - 10\frac{1}{7}$
25. $8\frac{4}{5} - 6\frac{2}{5}$
26. $10\frac{8}{9} - 8\frac{4}{9}$
27. $9\frac{6}{7} - 6\frac{2}{7}$
28. $7\frac{6}{7} - 4\frac{2}{7}$
29. $9\frac{5}{6} - 6\frac{1}{6}$
30. $3\frac{9}{10} - 1\frac{3}{10}$
31. $8\frac{2}{3} - 3\frac{1}{2}$
32. $9\frac{3}{4} - 1\frac{1}{8}$
33. $8\frac{1}{2} - 3\frac{1}{12}$
34. $11\frac{4}{11} - 9\frac{2}{11}$
35. $13\frac{1}{3} - 4\frac{1}{9}$
36. $12\frac{1}{6} - 7\frac{1}{12}$
37. $9\frac{3}{5} - 6\frac{3}{10}$
38. $12\frac{4}{5} - 9\frac{7}{10}$
39. $7\frac{3}{4} - 3\frac{3}{8}$
40. $4\frac{2}{3} - 2\frac{3}{9}$

$1 = \frac{8}{8}$
$\frac{5}{8} = \frac{5}{8}$
$\frac{3}{8}$ *Difference*

Say "One equals 8 eighths. 8 eighths and 5 eighths (writing $\frac{5}{8}$) are $\frac{3}{8}$."

Test: $\frac{3}{8} + \frac{5}{8} = \frac{8}{8}$ $\frac{8}{8} = 1$

1. $1 - \frac{1}{2} = ?$
2. $1 - \frac{1}{3} = ?$
3. $1 - \frac{1}{4} = ?$
4. $1 - \frac{1}{5} = ?$
5. $1 - \frac{1}{6} = ?$
6. $1 - \frac{1}{8} = ?$
7. $1 - ? = \frac{1}{2}$
8. $1 - ? = \frac{1}{3}$
9. $1 - ? = \frac{1}{4}$
10. $1 - ? = \frac{1}{5}$
11. $1 - \frac{5}{6} = ?$
12. $1 - \frac{2}{3} = ?$
12. $1 - \frac{7}{11} = ?$
14. $1 - \frac{1}{12} = ?$
15. $1 - ? = \frac{5}{12}$
16. $1 - ? = \frac{3}{20}$
17. $1 - ? = \frac{5}{7}$
18. $1 - ? = \frac{5}{18}$
19. $1 - ? = \frac{2}{3}$
20. $1 - ? = \frac{5}{6}$

Which is the smaller, $\frac{1}{2}$ or $\frac{5}{12}$?

$\frac{1}{2} = \frac{6}{12}$
$\frac{5}{12} = \frac{5}{12}$

First, reduce the fractions to a common denominator. *Second*, decide which fraction has the larger numerator.

Since 7 is smaller than 5, $\frac{5}{12}$ is the smaller fraction.

State which fraction in each of the following pairs is the smaller:

1. $\frac{3}{4}$ or $\frac{5}{8}$
2. $\frac{2}{3}$ or $\frac{1}{2}$
3. $\frac{1}{2}$ or $\frac{3}{8}$
4. $\frac{3}{8}$ or $\frac{1}{4}$
5. $\frac{1}{2}$ or $\frac{5}{8}$
6. $\frac{1}{2}$ or $\frac{1}{3}$
7. $\frac{3}{4}$ or $\frac{1}{12}$
8. $\frac{1}{3}$ or $\frac{5}{6}$
9. $\frac{1}{3}$ or $\frac{1}{2}$
10. $\frac{5}{6}$ or $\frac{11}{12}$
11. $\frac{3}{8}$ or $\frac{5}{6}$
12. $\frac{7}{12}$ or $\frac{1}{2}$
13. $\frac{3}{8}$ or $\frac{7}{12}$
14. $\frac{3}{8}$ or $\frac{7}{12}$
15. $\frac{5}{6}$ or $\frac{5}{12}$
16. 1 or $\frac{3}{8}$
17. $\frac{7}{24}$ or $\frac{1}{4}$
18. $\frac{11}{12}$ or $\frac{3}{4}$
19. $\frac{5}{12}$ or $\frac{7}{12}$
20. $\frac{5}{12}$ or $\frac{1}{2}$
21. $\frac{7}{12}$ or $\frac{11}{12}$
22. $\frac{1}{2}$ or $\frac{11}{12}$
23. $\frac{1}{2}$ or $\frac{3}{8}$
24. $\frac{3}{8}$ or $\frac{1}{2}$
25. 1 or $\frac{5}{8}$
26. $\frac{1}{2}$ or $\frac{3}{4}$
27. $\frac{3}{8}$ or $\frac{1}{2}$
28. $\frac{1}{10}$ or $\frac{3}{8}$
29. $\frac{3}{8}$ or $\frac{5}{12}$
30. $\frac{3}{24}$ or $\frac{1}{8}$
31. $\frac{5}{12}$ or $\frac{3}{8}$
32. $\frac{1}{2}$ or $\frac{5}{11}$

When the lower fraction is smaller than the upper, it may be subtracted.

When the *lower fraction* (or subtrahend) *is larger than the upper* (or minuend) *it cannot be subtracted.*

In which of the following can the lower fraction be subtracted from the upper, and why?

1. $\frac{1}{2}$	2. $\frac{2}{5}$	3. $\frac{7}{8}$	4. $\frac{3}{4}$	5. $\frac{7}{12}$	6. $\frac{1}{2}$	7. $\frac{3}{8}$	8. $\frac{2}{3}$
$\frac{1}{3}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{12}$	$\frac{1}{4}$	$\frac{2}{9}$
9. $\frac{1}{7}$	10. $\frac{7}{10}$	11. $\frac{14}{15}$	12. $\frac{5}{6}$	13. $\frac{17}{18}$	14. $\frac{17}{20}$	15. $\frac{15}{16}$	16. $\frac{3}{10}$
$\frac{1}{3}$	$\frac{3}{20}$	$\frac{2}{5}$	$\frac{3}{4}$	$\frac{5}{6}$	$\frac{7}{10}$	$\frac{7}{8}$	$\frac{7}{20}$
17. $\frac{3}{4}$	18. $\frac{1}{2}$	19. $\frac{1}{4}$	20. $\frac{2}{3}$	21. $\frac{7}{16}$	22. $\frac{3}{12}$	23. $\frac{3}{24}$	24. $\frac{3}{4}$
$\frac{7}{8}$	$\frac{1}{8}$	$\frac{4}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{5}{6}$	$\frac{1}{8}$	$\frac{2}{3}$

Give the answers to the following:

25. $\frac{1}{2} + \frac{1}{4} = ?$	36. $\frac{9}{10} - \frac{4}{5} = ?$	47. $1 + ? = 1\frac{3}{4}$
26. $\frac{3}{4} - \frac{1}{2} = ?$	37. $2 + 5 = ?$	48. $1\frac{3}{4} - ? = 1$
27. $\frac{1}{2} + \frac{1}{6} = ?$	38. $7 - 5 = ?$	49. $2 + ? = 2\frac{7}{8}$
28. $\frac{4}{6} - \frac{1}{2} = ?$	39. $7 - 2 = ?$	50. $2\frac{7}{8} - ? = \frac{7}{8}$
29. $\frac{1}{4} + \frac{1}{3} = ?$	40. $\frac{3}{7} + \frac{2}{7} = ?$	51. $2\frac{7}{8} - ? = 2$
30. $\frac{7}{12} - \frac{1}{3} = ?$	41. $\frac{5}{7} - \frac{3}{7} = ?$	52. $\frac{4}{7} + ? = 3\frac{4}{7}$
31. $\frac{3}{4} + \frac{1}{8} = ?$	42. $\frac{5}{7} - \frac{2}{7} = ?$	53. $3\frac{4}{7} - ? = \frac{4}{7}$
32. $\frac{7}{8} - \frac{3}{4} = ?$	43. $\frac{3}{4} + \frac{1}{8} = ?$	54. $8\frac{1}{8} + ? = 9$
33. $\frac{3}{5} + \frac{3}{10} = ?$	44. $\frac{7}{8} - \frac{1}{8} = ?$	55. $9 - ? = 8\frac{1}{8}$
34. $\frac{9}{10} - \frac{3}{5} = ?$	45. $\frac{7}{8} - \frac{3}{8} = ?$	56. $5\frac{3}{4} + ? = 7\frac{3}{4}$
35. $\frac{4}{5} + \frac{1}{10} = ?$	46. $\frac{3}{4} - \frac{1}{4} = ?$	57. $7\frac{3}{4} - ? = 5\frac{3}{4}$

How many answers can you give in five minutes?

1. $\frac{5}{12} + \frac{1}{4} = ?$
2. $\frac{8}{12} - \frac{5}{12} = ?$
3. $\frac{8}{12} - \frac{1}{4} = ?$
4. $\frac{5}{12} + ? = \frac{2}{3}$
5. $? + \frac{5}{12} = \frac{3}{4}$
6. $\frac{4}{15} + \frac{1}{3} = ?$
7. $\frac{9}{15} - \frac{1}{3} = ?$
8. $\frac{9}{15} - \frac{4}{15} = ?$
9. $\frac{4}{15} + ? = \frac{3}{5}$
10. $\frac{1}{3} + ? = \frac{3}{5}$
11. $\frac{7}{15} + \frac{2}{15} = ?$
12. $\frac{13}{15} - \frac{7}{15} = ?$
13. $\frac{13}{15} - \frac{2}{15} = ?$
14. $\frac{7}{15} + ? = \frac{13}{15}$
15. $\frac{2}{15} + ? = \frac{13}{15}$
16. $\frac{5}{8} + \frac{1}{4} = ?$
17. $\frac{5}{8} + ? = \frac{7}{8}$
18. $\frac{1}{4} + ? = \frac{7}{8}$
19. $\frac{7}{8} - ? = \frac{5}{8}$
20. $\frac{7}{8} - ? = \frac{1}{4}$
21. $12\frac{1}{2} + ? = 14$
22. $14 - ? = 12\frac{1}{2}$
23. $16\frac{2}{3} + ? = 17$
24. $17 - ? = 16\frac{2}{3}$
25. $10\frac{1}{5} + ? = 10\frac{4}{5}$
26. $10\frac{4}{5} - ? = 10\frac{1}{5}$
27. $6\frac{1}{3} + ? = 7\frac{2}{3}$
28. $7\frac{2}{3} - ? = 6\frac{1}{3}$
29. $8\frac{3}{4} + ? = 10\frac{1}{4}$
30. $10\frac{1}{4} - ? = 8\frac{3}{4}$

NOTE. — Review by giving answers to 1, 11, 21; 2, 12, 22, etc.

Find the missing addend:

31. $12\frac{1}{2}$ + ? = 13
32. $11\frac{3}{4}$ + ? = 12
33. $9\frac{1}{5}$ + ? = 10
34. $7\frac{5}{6}$ + ? = 8
35. $9\frac{3}{7}$ + ? = 10
36. $21\frac{3}{5}$ + ? = 22
37. $16\frac{1}{2}$ + ? = 18
38. $21\frac{1}{4}$ + ? = 25
39. $13\frac{3}{5}$ + ? = 16
40. $11\frac{5}{7}$ + ? = 18
41. $35\frac{1}{4}$ + ? = $36\frac{1}{4}$
42. $18\frac{3}{4}$ + ? = $28\frac{3}{4}$
43. $17\frac{1}{6}$ + ? = $20\frac{5}{6}$
44. $18\frac{1}{9}$ + ? = $18\frac{7}{9}$
45. $56\frac{3}{5}$ + ? = $57\frac{4}{5}$
46. $11\frac{1}{7}$ + ? = $13\frac{6}{7}$
47. $21\frac{7}{11}$ + ? = $25\frac{9}{11}$
48. $3\frac{1}{3}$ + ? = $4\frac{1}{3}$
49. $5\frac{2}{3}$ + ? = 6
50. $2\frac{1}{12}$ + ? = $3\frac{5}{12}$
51. $6\frac{1}{4}$ + ? = $7\frac{3}{4}$
52. $7\frac{2}{5}$ + ? = $9\frac{3}{5}$
53. $11\frac{3}{11}$ + ? = $13\frac{9}{11}$
54. $15\frac{3}{13}$ + ? = $20\frac{7}{13}$
55. $13\frac{1}{3}$ + ? = $15\frac{2}{3}$

Subtract:

$$\begin{array}{l} 6 \\ 3\frac{3}{4} \\ \hline 2\frac{1}{4} \end{array}$$

Say "$\frac{3}{4}$ and $\frac{1}{4}$ (writing $\frac{1}{4}$) are $\frac{4}{4}$ or 1."
Add 1 to 3, making it 4.
Say "4 and 2 (writing 2) are 6."

Test: $3\frac{3}{4} + 2\frac{1}{4} = 6$

Subtract and prove:

1. $\begin{array}{l} 6 \\ \underline{5\frac{1}{5}} \end{array}$	2. $\begin{array}{l} 7 \\ \underline{3\frac{1}{4}} \end{array}$	3. $\begin{array}{l} 5 \\ \underline{2\frac{2}{3}} \end{array}$	4. $\begin{array}{l} 9 \\ \underline{4\frac{3}{5}} \end{array}$	5. $\begin{array}{l} 8 \\ \underline{2\frac{4}{7}} \end{array}$
6. $\begin{array}{l} 4 \\ \underline{2\frac{1}{7}} \end{array}$	7. $\begin{array}{l} 9 \\ \underline{3\frac{4}{5}} \end{array}$	8. $\begin{array}{l} 11 \\ \underline{7\frac{3}{4}} \end{array}$	9. $\begin{array}{l} 13 \\ \underline{3\frac{5}{7}} \end{array}$	10. $\begin{array}{l} 15 \\ \underline{2\frac{3}{11}} \end{array}$
11. $\begin{array}{l} 21 \\ \underline{5\frac{8}{11}} \end{array}$	12. $\begin{array}{l} 16 \\ \underline{2\frac{3}{10}} \end{array}$	13. $\begin{array}{l} 15 \\ \underline{12\frac{5}{12}} \end{array}$	14. $\begin{array}{l} 21 \\ \underline{11\frac{1}{5}} \end{array}$	15. $\begin{array}{l} 24 \\ \underline{14\frac{1}{7}} \end{array}$
16. $\begin{array}{l} 28 \\ \underline{19\frac{1}{3}} \end{array}$	17. $\begin{array}{l} 16 \\ \underline{12\frac{2}{7}} \end{array}$	18. $\begin{array}{l} 31 \\ \underline{29\frac{2}{3}} \end{array}$	19. $\begin{array}{l} 19 \\ \underline{18\frac{3}{4}} \end{array}$	20. $\begin{array}{l} 13 \\ \underline{12\frac{7}{12}} \end{array}$

Solve ten examples. Keep a record of your time.

21.	$10 - 2\frac{1}{8} = ?$	31.	$16 - ? = 10$	41.	$? + 5 = 20$
22.	$12 - 3\frac{2}{7} = ?$	32.	$25 - ? = 5$	42.	$? + 11 = 19$
23.	$15 - 9\frac{3}{8} = ?$	33.	$17 - ? = 7\frac{1}{4}$	43.	$? + \frac{1}{4} = \frac{3}{4}$
24.	$4 - 2\frac{1}{8} = ?$	34.	$11 - ? = 8\frac{1}{3}$	44.	$? + \frac{1}{4} = 1$
25.	$7 - 5\frac{1}{3} = ?$	35.	$19 - ? = 4\frac{2}{5}$	45.	$? + \frac{1}{3} = 2$
26.	$9 - 8\frac{4}{5} = ?$	36.	$33 - ? = 13$	46.	$? + 1\frac{1}{3} = 4$
27.	$19 - 12\frac{11}{12} = ?$	37.	$33 - ? = 12\frac{1}{2}$	47.	$? + 5\frac{1}{2} = 7$
28.	$8 - 5\frac{7}{8} = ?$	38.	$19 - ? = 8\frac{3}{4}$	48.	$? + 6\frac{3}{4} = 10$
29.	$11 - 6\frac{2}{3} = ?$	39.	$37 - ? = 17\frac{1}{5}$	49.	$? + 7\frac{1}{5} = 9$
30.	$13 - 3\frac{3}{4} = ?$	40.	$21 - ? = 6\frac{2}{3}$	50.	$? + 13\frac{2}{3} = 15$

Subtract:

$4\frac{1}{4} = 4\frac{3}{12}$
$2\frac{1}{3} = 2\frac{4}{12}$
$1\frac{11}{12}$

Say "$\frac{4}{12}$ and $\frac{11}{12}$ (writing $\frac{11}{12}$) are $\frac{15}{12}$ $(1\frac{3}{12})$."
Add 1 to 2, making it 3.
Say "3 and 1 (writing 1) are 4."

Test: $2\frac{4}{12} + 1\frac{11}{12} = 4\frac{1}{4}$

Subtract and prove:

1. $5\frac{1}{5}$	2. $12\frac{1}{12}$	3. $8\frac{1}{2}$	4. $10\frac{3}{8}$	5. $12\frac{1}{5}$
$4\frac{2}{5}$	$7\frac{1}{3}$	$4\frac{1}{8}$	$5\frac{3}{4}$	$8\frac{7}{8}$
6. $4\frac{1}{2}$	7. $7\frac{3}{16}$	8. $13\frac{1}{9}$	9. $5\frac{5}{12}$	10. $4\frac{1}{2}$
$1\frac{2}{3}$	$5\frac{1}{2}$	$5\frac{5}{9}$	$1\frac{2}{3}$	$3\frac{5}{6}$
11. $10\frac{1}{2}$	12. $8\frac{1}{4}$	13. $12\frac{1}{3}$	14. $13\frac{1}{2}$	15. $7\frac{1}{3}$
$3\frac{15}{16}$	$5\frac{1}{2}$	$6\frac{5}{6}$	$7\frac{7}{8}$	$3\frac{5}{12}$
16. $10\frac{1}{3}$	17. $12\frac{2}{5}$	18. $10\frac{1}{10}$	19. $8\frac{3}{4}$	20. $11\frac{2}{3}$
$6\frac{5}{9}$	$5\frac{3}{8}$	$4\frac{1}{2}$	$2\frac{4}{5}$	$4\frac{7}{9}$

Solve five examples. Keep a record of your time.

21. $6\frac{1}{3} - 2\frac{11}{12}$	31. $8\frac{3}{16} - 4\frac{3}{8}$	41. $12\frac{1}{9} - 9\frac{1}{6}$
22. $13\frac{1}{6} - 4\frac{1}{3}$	32. $10\frac{1}{16} - 5\frac{3}{8}$	42. $10\frac{1}{8} - 5\frac{3}{16}$
23. $16\frac{1}{8} - 4\frac{1}{2}$	33. $15\frac{5}{16} - 4\frac{1}{2}$	43. $13\frac{1}{7} - 8\frac{5}{7}$
24. $5\frac{1}{8} - 2\frac{1}{4}$	34. $12\frac{1}{10} - 2\frac{3}{20}$	44. $12\frac{7}{10} - 7\frac{2}{5}$
25. $3\frac{1}{2} - 2\frac{3}{4}$	35. $11\frac{3}{10} - 5\frac{7}{15}$	45. $8\frac{2}{3} - 2\frac{5}{7}$
26. $7\frac{1}{2} - 2\frac{3}{8}$	36. $19\frac{3}{10} - 2\frac{2}{3}$	46. $6\frac{3}{7} - 5\frac{2}{7}$
27. $8\frac{1}{2} - 3\frac{5}{12}$	37. $6\frac{1}{12} - 4\frac{2}{3}$	47. $11\frac{3}{5} - 4\frac{1}{3}$
28. $8\frac{3}{8} - 2\frac{7}{16}$	38. $15\frac{1}{8} - 6\frac{1}{3}$	48. $18\frac{1}{6} - 9\frac{7}{12}$
29. $13\frac{5}{8} - 8\frac{7}{8}$	39. $18\frac{5}{16} - 9\frac{1}{2}$	49. $21\frac{5}{8} - 4\frac{3}{4}$
30. $3\frac{1}{12} - 1\frac{1}{16}$	40. $7\frac{1}{5} - 4\frac{7}{8}$	50. $16\frac{9}{16} - 4\frac{1}{2}$

Subtract and prove:

1. $2\frac{1}{5}$	7. 8	13. $8\frac{1}{4}$	19. $7\frac{5}{8}$
$1\frac{9}{10}$	$4\frac{3}{4}$	$5\frac{1}{20}$	$5\frac{1}{16}$
2. $3\frac{1}{6}$	8. 11	14. 12	20. $9\frac{7}{8}$
$1\frac{1}{3}$	$7\frac{11}{16}$	$8\frac{9}{10}$	$1\frac{5}{16}$
3. $4\frac{1}{2}$	9. $13\frac{1}{4}$	15. $9\frac{5}{6}$	21. $17\frac{3}{4}$
$2\frac{1}{4}$	$1\frac{5}{8}$	$6\frac{5}{12}$	$4\frac{9}{16}$
4. $8\frac{1}{20}$	10. $7\frac{3}{5}$	16. $5\frac{5}{6}$	22. $13\frac{4}{5}$
$2\frac{1}{10}$	$4\frac{11}{15}$	$2\frac{2}{3}$	$6\frac{14}{15}$
5. $12\frac{1}{3}$	11. $5\frac{3}{10}$	17. $15\frac{2}{3}$	23. 3
$4\frac{4}{15}$	$1\frac{4}{5}$	$2\frac{2}{9}$	$1\frac{3}{10}$
6. $6\frac{2}{3}$	12. $9\frac{2}{3}$	18. $8\frac{1}{4}$	24. $9\frac{2}{5}$
$3\frac{5}{9}$	$5\frac{5}{6}$	$6\frac{7}{16}$	$7\frac{1}{15}$

25. From a board $8\frac{1}{2}$ ft. long a piece $4\frac{1}{2}$ ft. long is cut. Find the length of the remaining piece.

26. From a bank containing $5\frac{1}{2}$ dollars, $3\frac{3}{4}$ dollars are used. How many dollars remain?

27. Milton earned $\frac{3}{4}$ of a dollar and used $\frac{1}{4}$ of a dollar for a ball. How much had he left?

28. Walter had $1\frac{1}{2}$ acres of land planted to strawberries. If $\frac{3}{4}$ of an acre was set to new plants, how much was set to old plants?

29. From a piece of cloth containing $8\frac{3}{4}$ yards, $4\frac{1}{2}$ yards are cut. How many yards remain?

Subtract and prove:

1. $11\frac{1}{2}$	5. $12\frac{2}{5}$	9. $19\frac{1}{2}$	13. $11\frac{1}{4}$
$6\frac{15}{16}$	$2\frac{8}{15}$	$4\frac{13}{16}$	$8\frac{3}{20}$
2. $6\frac{1}{4}$	6. $10\frac{3}{4}$	10. $8\frac{2}{3}$	14. $12\frac{1}{2}$
$2\frac{3}{8}$	$7\frac{1}{2}$	$3\frac{7}{12}$	$3\frac{7}{20}$
3. $13\frac{1}{3}$	7. $6\frac{1}{8}$	11. $11\frac{1}{5}$	15. $16\frac{3}{4}$
$3\frac{1}{6}$	$4\frac{3}{16}$	$5\frac{13}{15}$	$4\frac{9}{20}$
4. $7\frac{1}{6}$	8. $9\frac{3}{16}$	12. $6\frac{4}{5}$	16. $5\frac{2}{5}$
$2\frac{1}{12}$	$4\frac{7}{8}$	$1\frac{3}{5}$	$3\frac{1}{5}$

17. William earned $\frac{3}{4}$ of a dollar on Monday and $\frac{1}{2}$ a dollar on Tuesday. How much did he earn on these two days?

18. From a can containing $20\frac{1}{2}$ quarts of milk, $4\frac{1}{2}$ quarts are sold. How many quarts remain?

19. John and Fred together saved $4\frac{3}{4}$ dollars. If John saved $2\frac{1}{4}$ dollars, what did Fred save?

20. From a package of cheese weighing $37\frac{1}{2}$ pounds, $21\frac{3}{4}$ pounds are sold. How many pounds remain?

21. There are $12\frac{1}{4}$ tons of coal in one bin and $6\frac{3}{4}$ tons in a second bin. How many tons are there in both bins? How many more tons are there in the first bin than in the second?

22. What number must be subtracted from $13\frac{1}{2}$ to leave a remainder of 10?

23. What must be subtracted from $19\frac{3}{4}$ to leave a remainder of $9\frac{7}{8}$?

Add and test:

1. $\frac{1}{3}$ $\frac{1}{4}$	8. $\frac{1}{2}$ $\frac{1}{3}$	15. $\frac{1}{6}$ $\frac{11}{12}$	22. $\frac{2}{3}$ $\frac{5}{8}$	29. $\frac{3}{4}$ $\frac{1}{2}$
2. $\frac{1}{5}$ $\frac{3}{10}$	9. $\frac{5}{6}$ $\frac{9}{10}$	16. $\frac{1}{8}$ $\frac{3}{10}$	23. $\frac{13}{24}$ $\frac{5}{8}$	30. $\frac{1}{5}$ $\frac{5}{9}$
3. $\frac{1}{2}$ $\frac{1}{6}$	10. $\frac{1}{2}$ $\frac{4}{5}$	17. $\frac{3}{8}$ $\frac{1}{12}$	24. $\frac{1}{3}$ $\frac{1}{5}$	31. $\frac{2}{5}$ $\frac{1}{2}$
4. $\frac{2}{3}$ $\frac{7}{8}$	11. $\frac{9}{10}$ $\frac{2}{15}$	18. $\frac{4}{5}$ $\frac{7}{20}$	25. $\frac{7}{10}$ $\frac{11}{20}$	32. $\frac{5}{9}$ $\frac{13}{15}$
5. $\frac{5}{8}$ $\frac{5}{12}$	12. $\frac{1}{3}$ $\frac{1}{8}$	19. $\frac{5}{6}$ $\frac{11}{15}$	26. $\frac{1}{3}$ $\frac{3}{5}$	33. $\frac{1}{2}$ $\frac{13}{20}$
6. $\frac{1}{2}$ $\frac{1}{4}$	13. $\frac{2}{3}$ $\frac{5}{8}$	20. $\frac{1}{2}$ $\frac{2}{3}$	27. $\frac{2}{5}$ $\frac{2}{15}$	34. $\frac{7}{10}$ $\frac{11}{12}$
7. $\frac{1}{2}$ $\frac{1}{5}$	14. $\frac{2}{3}$ $\frac{1}{4}$	21. $\frac{3}{5}$ $\frac{1}{2}$	28. $\frac{1}{4}$ $\frac{2}{9}$	35. $\frac{4}{5}$ $\frac{1}{10}$

Reduce to simplest form:

36. $\frac{4}{8}$	39. $\frac{4}{6}$	42. $\frac{6}{8}$	45. $\frac{4}{12}$	48. $3\frac{2}{4}$
37. $\frac{5}{10}$	40. $\frac{2}{2}$	43. $\frac{3}{6}$	46. $\frac{5}{5}$	49. $4\frac{2}{8}$
38. $\frac{10}{12}$	41. $\frac{2}{4}$	44. $\frac{3}{12}$	47. $\frac{9}{12}$	50. $5\frac{6}{8}$

Subtract and test:

51. $8\frac{1}{3}$ $4\frac{5}{6}$	52. $11\frac{1}{5}$ $10\frac{1}{5}$	53. $7\frac{5}{9}$ $2\frac{2}{3}$	54. $13\frac{3}{11}$ $3\frac{3}{11}$
55. $15\frac{1}{7}$ $9\frac{2}{14}$	56. $12\frac{1}{2}$ $9\frac{3}{4}$	57. $6\frac{3}{8}$ $5\frac{1}{4}$	58. $4\frac{7}{15}$ $2\frac{1}{3}$

Reduce to simplest form:

1. $\frac{12}{18}$
2. $\frac{6}{16}$
3. $\frac{2}{8}$
4. $\frac{10}{15}$
5. $\frac{18}{24}$
6. $\frac{6}{10}$
7. $\frac{14}{21}$
8. $\frac{30}{40}$
9. $\frac{8}{16}$
10. $\frac{15}{20}$
11. $\frac{16}{24}$
12. $\frac{8}{12}$
13. $\frac{11}{22}$
14. $\frac{6}{18}$
15. $\frac{4}{12}$
16. $\frac{10}{5}$
17. $\frac{4}{18}$
18. $\frac{13}{26}$
19. $\frac{8}{12}$
20. $\frac{15}{18}$
21. $\frac{9}{18}$
22. $\frac{15}{25}$
23. $\frac{24}{12}$
24. $\frac{3}{18}$
25. 1

Reduce to common denominators:

26. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$
27. $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}$
28. $\frac{1}{2}, \frac{1}{5}, \frac{3}{5}$
29. $\frac{1}{3}, \frac{1}{5}, \frac{1}{6}$
30. $\frac{2}{5}, \frac{4}{5}, \frac{5}{6}$
31. $\frac{2}{3}, \frac{1}{4}, \frac{3}{8}$
32. $\frac{3}{4}, \frac{1}{2}, \frac{1}{8}$
33. $\frac{1}{3}, \frac{1}{8}, \frac{5}{8}$
34. $\frac{2}{3}, \frac{3}{8}, \frac{5}{8}$
35. $\frac{3}{4}, \frac{1}{6}, \frac{7}{8}$
36. $\frac{2}{9}, \frac{5}{12}, \frac{7}{12}$
37. $\frac{3}{10}, \frac{4}{15}, \frac{1}{6}$
38. $\frac{1}{10}, \frac{1}{6}, \frac{1}{5}$
39. $\frac{1}{2}, \frac{7}{10}, \frac{1}{12}$
40. $\frac{9}{10}, \frac{3}{20}, \frac{8}{15}$

Add:

41. $4\frac{1}{2} + 3\frac{1}{4}$
42. $7\frac{1}{8} + 5\frac{3}{4}$
43. $6\frac{5}{6} + 2\frac{1}{3}$
44. $8\frac{1}{4} + 3\frac{1}{3}$
45. $7\frac{3}{5} + 8\frac{1}{4}$
46. $9\frac{1}{5} + 3\frac{1}{3}$
47. $7\frac{4}{7} + 1\frac{3}{7}$
48. $8\frac{3}{11} + 9\frac{4}{11}$
49. $6\frac{4}{14} + 4\frac{3}{7}$
50. $5\frac{5}{12} + 6\frac{1}{3}$
51. $11\frac{1}{4} + 6\frac{1}{5}$
52. $8\frac{1}{6} + 9\frac{1}{2}$
53. $3\frac{3}{8} + 4\frac{5}{6}$
54. $4\frac{2}{3} + 8\frac{3}{5}$
55. $1\frac{1}{5} + 2\frac{1}{2}$

Subtract:

56. $\frac{7}{8} - \frac{1}{2}$
57. $\frac{3}{11} - \frac{2}{11}$
58. $1 - \frac{3}{7}$
59. $2 - \frac{4}{5}$
60. $11 - 9\frac{4}{9}$
61. $4\frac{1}{4} - 2\frac{1}{2}$
62. $7\frac{3}{8} - 2\frac{3}{4}$
63. $11\frac{5}{7} - 6\frac{6}{7}$
64. $21\frac{5}{12} - 8\frac{3}{4}$
65. $16\frac{1}{9} - 4\frac{2}{3}$
66. $13\frac{1}{4} - 7\frac{5}{8}$
67. $9 - 8\frac{3}{11}$
68. $14\frac{1}{2} - 7\frac{1}{4}$
69. $15\frac{3}{8} - 9\frac{7}{16}$
70. $9\frac{5}{21} - 1\frac{6}{7}$

Read, giving sum:

1. $\frac{1}{4}$ and $\frac{3}{4}$
2. $\frac{1}{8}$ and $\frac{3}{8}$
3. $\frac{2}{3}$ and $\frac{1}{3}$
4. $\frac{1}{10}$ and $\frac{7}{10}$
5. $\frac{5}{6}$ and $\frac{1}{6}$
6. $\frac{3}{5}$ and $\frac{4}{5}$
7. $\frac{7}{8}$ and $\frac{3}{8}$
8. $\frac{2}{9}$ and $\frac{4}{9}$

Read, giving difference:

9. $\frac{7}{8} - \frac{5}{8}$
10. $\frac{11}{12} - \frac{5}{12}$
11. $\frac{5}{6} - \frac{1}{6}$
12. $\frac{4}{5} - \frac{1}{5}$
13. $\frac{5}{8} - \frac{1}{8}$
14. $\frac{7}{12} - \frac{5}{12}$
15. $\frac{8}{9} - \frac{2}{9}$
16. $\frac{7}{10} - \frac{3}{10}$

$3 \times \frac{2}{3} = ?$	$2 \times \frac{1}{4} = ?$
3 times 2 thirds = 6 thirds	2 times 1 fourth = 2 fourths
$\frac{6}{3} = 2$	$\frac{2}{4} = \frac{1}{2}$

Give the products:

17. $2 \times \frac{1}{3}$
18. $3 \times \frac{1}{5}$
19. $5 \times \frac{1}{7}$
20. $3 \times \frac{2}{7}$
21. $2 \times \frac{2}{5}$
22. $8 \times \frac{1}{2}$
23. $7 \times \frac{1}{10}$
24. $3 \times \frac{2}{5}$
25. $2 \times \frac{2}{7}$
26. $4 \times \frac{1}{4}$
27. $10 \times \frac{2}{5}$
28. $4 \times \frac{2}{3}$
29. $7 \times \frac{1}{9}$
30. $6 \times \frac{2}{5}$
31. $8 \times \frac{2}{7}$
32. $5 \times \frac{1}{5}$
33. $9 \times \frac{2}{3}$
34. $4 \times \frac{3}{8}$
35. $7 \times \frac{5}{8}$
36. $5 \times \frac{4}{7}$

37. Three times one fourth are how many fourths?
38. Nine times one eighth are how many eighths?
39. How many fourths are there in one yard?
40. How many eighths are there in one yard?
41. Two eighths and three eighths are how many?
42. Eight times one fourth of a yard will equal how many yards?

Divide $\frac{3}{4}$ by 3. $\frac{3}{4} \div 3 = \frac{1}{4}$

3 fourths divided by 3 = 1 fourth

Dividing the numerator of the fraction divides the fraction.

Give the quotients:

1. $\frac{3}{5} \div 3 = ?$
2. $\frac{6}{5} \div 2 = ?$
3. $\frac{4}{5} \div 4 = ?$
4. $\frac{3}{7} \div 3 = ?$
5. $\frac{3}{8} \div 3 = ?$
6. $\frac{8}{11} \div 4 = ?$
7. $\frac{8}{11} \div 2 = ?$
8. $\frac{4}{7} \div 4 = ?$
9. $\frac{3}{11} \div 3 = ?$
10. $\frac{8}{13} \div 8 = ?$
11. $\frac{6}{11} \div 3 = ?$
12. $\frac{5}{8} \div 5 = ?$
13. $\frac{7}{12} \div 7 = ?$
14. $\frac{6}{11} \div 3 = ?$
15. $\frac{5}{11} \div 5 = ?$
16. $\frac{1}{7} \div 1 = ?$
17. $\frac{8}{7} \div 2 = ?$
18. $\frac{7}{15} \div 7 = ?$
19. $\frac{8}{9} \div 2 = ?$
20. $\frac{5}{17} \div 5 = ?$
21. $\frac{8}{7} \div 8 = ?$
22. $\frac{6}{11} \div 2 = ?$
23. $\frac{8}{9} \div 4 = ?$
24. $\frac{16}{17} \div 8 = ?$
25. $\frac{12}{13} \div 4 = ?$
26. $\frac{8}{17} \div 4 = ?$
27. $\frac{6}{11} \div 6 = ?$
28. $\frac{3}{4} \div 3 = ?$
29. $\frac{8}{7} \div 4 = ?$
30. $\frac{8}{9} \div 8 = ?$

$\frac{2}{2} \div \frac{1}{2} = 2$

Think how many times $\frac{1}{2}$ is contained in $\frac{2}{2}$?

$\frac{3}{4} \div \frac{1}{4} = 3$

Think how many times $\frac{1}{4}$ is contained in $\frac{3}{4}$?

Find:

31. $\frac{3}{12} \div \frac{1}{12}$
32. $\frac{4}{5} \div \frac{1}{5}$
33. $\frac{6}{7} \div \frac{1}{7}$
34. $\frac{3}{5} \div \frac{1}{5}$
35. $\frac{4}{7} \div \frac{1}{7}$
36. $\frac{6}{7} \div \frac{2}{7}$
37. $\frac{6}{11} \div \frac{3}{11}$
38. $\frac{8}{11} \div \frac{2}{11}$
39. $\frac{8}{11} \div \frac{4}{11}$
40. $\frac{4}{7} \div \frac{2}{7}$
41. $\frac{7}{11} + \frac{4}{11}$
42. $\frac{7}{11} - \frac{4}{11}$
43. $\frac{7}{11} \div \frac{1}{11}$
44. $\frac{6}{11} \div 3$
45. $\frac{6}{11} \div \frac{2}{11}$

Solve $\frac{12 \times 15}{9 \times 20}$ by cancellation.

Solution $\frac{\overset{1}{\cancel{12}} \times \overset{1}{\cancel{15}}}{\underset{3}{\cancel{9}} \times \underset{4}{\cancel{20}}} = \frac{1}{1} = 1$

Striking out the same factor from both dividend and divisor is **cancellation.**

1. $\frac{10 \times 6}{4 \times 5}$
2. $\frac{12 \times 20}{15 \times 18}$
3. $\frac{14 \times 9}{21 \times 2}$
4. $\frac{24 \times 5}{20 \times 4}$
5. $\frac{22 \times 3}{33 \times 1}$
6. $\frac{15 \times 18}{5 \times 6}$
7. $\frac{21 \times 16}{14 \times 2}$
8. $\frac{30 \times 14}{21 \times 5}$
9. $\frac{25 \times 49}{35 \times 14}$
10. $\frac{18 \times 14}{21 \times 6}$
11. $\frac{10 \times 24}{20 \times 6}$
12. $\frac{28 \times 9}{3 \times 21}$
13. $\frac{15 \times 7}{21 \times 5}$
14. $\frac{12 \times 15}{10 \times 18}$
15. $\frac{8 \times 14}{7 \times 4}$
16. $\frac{26 \times 24}{16 \times 13}$
17. $\frac{30 \times 22}{15 \times 33}$
18. $\frac{14 \times 30}{10 \times 21}$
19. $\frac{19 \times 55}{11 \times 1}$
20. $\frac{18 \times 28}{21 \times 9}$

21. Divide 4×9 by 2×6.
22. Divide 21×11 by 33×7.
23. Divide 15×21 by 5×7.
24. Divide 9×12 by 6×3.
25. Divide 25×14 by 35.
26. Divide 12×20 by 16.
27. Divide 9×28 by 21×6.

Mental Test

1. $3 + 5 + 7 + 6 + 3 = ?$
2. $13 + ? = 25$
3. $14 \times 10 = ?$
4. $8 \times ? = 64$
5. $\frac{1}{4} + \frac{1}{2} = ?$
6. $7 + ? = 21$
7. $? + 6 = 16$
8. $1.00 - \$.75 = ?$
9. $17 + 13 = ?$
10. $\$.40 + ? = \$1.00$

Short Written Tests

I. *Find the sums. Test your work. Do not copy the addends.*

1.	2.	3.	4.
149	49	$ 3.65	4969
384	789	13.85	7998
576	8	4.91	8779
834	394	11.69	4367
987	979	99.00	7889
389	898	76.89	8094
796	49	49.98	3809

II. *Subtract and test:*

1.	2.	3.	4.
4837	46875	3005	706,080
2938	9384	106	15,076

III. *Divide and test:*

1. 475 by 25 2. 2639 by 13 3. 3072 by 60 4. 9215 by 19

IV. *Add:*

1.	2.	3.	4.
$16\frac{3}{11}$	$6\frac{2}{3}$	$8\frac{1}{4}$	$7\frac{1}{4}$
$7\frac{5}{11}$	$4\frac{1}{2}$	$9\frac{3}{8}$	$8\frac{5}{6}$

V. *Subtract:*

1.	2.	3.	4.
$14\frac{7}{8}$	$7\frac{1}{5}$	$5\frac{4}{9}$	$3\frac{1}{6}$
$5\frac{3}{4}$	$5\frac{2}{3}$	$2\frac{2}{3}$	$1\frac{3}{8}$

To solve a problem:

First: Read the problem very carefully.

Second: Read it a second time to find what is given.

Third: Read it a third time to find what is to be found.

Fourth: Determine the process to be used in solving the problem.

Fifth: Solve.

In the following problems tell what I am given, what I am to find, and how I am to find it. Give the analysis.

Example A. Howard sold 40 papers on Monday, 48 on Tuesday, and 169 during the remainder of the week. How many papers did he sell in all during the week?

Given: **The number of papers sold on Monday, Tuesday, and the rest of the week.**

To find: **The total number of papers sold.**

Process: **Addition.**

Analysis: **The number of papers sold is the sum of 40, 48, and 169, which is 257. Therefore, 257 papers.**

Example B. William sold a kite for 95 cents. If it cost him 45 cents to make it, what did he gain?

Given: **The cost of the kite and the selling price.**

To find: **The gain.**

Process: **Subtraction.**

Analysis: **The number of cents gained is the difference between 45 and 95, which is 50. Therefore he gained 50 cents.**

Example C. What will ten pounds of sugar cost at 8 cents a pound?

Given: The number of pounds of sugar and the cost per pound.

To find: The cost of the ten pounds.

Process: Multiplication.

Analysis: The number of cents the sugar will cost is the product of 10 and 8, which is 80. Therefore the sugar will cost 80 cents.

Example D. How many chairs at $6 each may be bought for $90?

Given: The total cost of the chairs and the cost of one.

To find: The number of chairs bought.

Process: Division.

Analysis: The number of chairs is the quotient of 90 divided by 6, which is 15. Therefore 15 chairs were bought.

1. Find the cost of 24 dozen cookies at 12 cents a dozen.

2. How many tons of coal at $12 a ton may be bought for $120?

3. A merchant sold goods costing $96 for $126. What was his gain?

4. The street car conductor collected the following amounts on his trips for the day: $9.60, $4.20, $11.80, and $16.30. How much did he collect for the day?

5. Mary sold for 64 cents a book which cost her 98 cents. How much did she lose?

6. Find the cost of 12 oranges at 5 cents each.

7. A farmer sold a portion of his farm for $2200. If he sold for $50 an acre, how many acres did he sell?

8. Find the cost of one city lot if 4 may be bought for $4400.

9. Find the cost of two dozen pairs of gloves at $2 per pair.

10. A farmer sold the hay from three lots as follows: first lot 9 tons, second lot 13 tons, and the third lot 17 tons. How many tons did he sell from the three lots?

11. From a pile containing 15 thousand bricks, 11 thousand are sold. How many bricks are unsold?

12. Find the price of one tire if four cost $76.

13. What must be paid for 16 bushels of peaches at $2 a bushel?

14. Find the cost of suits for 13 football players at $12 each.

15. If 40 maps may be bought for 80 cents, what is the cost of each map?

16. From a tank containing 31 gallons, 18 gallons are left. How many gallons have been sold?

17. How many bushels of oats at $2 a bushel can be bought for $40?

18. Find the cost of 20 pounds of sugar at 6¢ a pound.

19. How many pencils at 3¢ each can be bought for 18¢?

20. There are 21 eggs in one basket, 26 in a second, and 35 in the third. How many eggs are there in the three baskets?

21. A cake cost Florence 73¢. She sold it for 95¢. What did she gain?

22. What must be paid for 30 apple trees at $2 each?

Problems with Numbers Omitted

1. John earned —— dollars, Frank —— dollars, and Charles —— dollars. How many dollars did they earn together?

2. Albert lost —— of his twenty chickens. How many had he left?

3. The product of two factors is ——. One factor is ——. What is the other factor?

4. Mr. Smith earns —— dollars each week. If he saves —— dollars a week, how many dollars does he spend?

5. Find the cost of —— tons of coal at —— dollars a ton.

6. The sum of two numbers is ——. One number is ——. What is the other number?

7. Gilbert has —— dollars. He spends $\frac{1}{2}$ of it for clothes. How much has he left?

8. If ten books cost —— dollars, what will 2 books cost?

9. There are —— quarts of berries in one basket, —— quarts in another, and —— quarts in a third. How many quarts are there in the three baskets?

10. From a bin containing —— quarts of oats —— quarts have been used. How many quarts remain?

11. The factors of a number are ——, ——, ——. What is the number?

12. How many ducks at —— dollars each can be bought for —— dollars?

12 inches (in.)	**= 1 foot (ft.)**
3 feet	**= 1 yard (yd.)**

A. Change the following to *feet:*

1. 24 inches	**2.** 60 inches	**3.** 36 inches
4. 96 inches	**5.** 84 inches	**6.** 9 yards
7. 90 inches	**8.** 72 inches	**9.** 54 inches
10. 36 yards	**11.** 25 yards	**12.** 48 inches

B. Change the following to *yards:*

1. 3 feet	**2.** 12 feet	**3.** 144 inches
4. 36 inches	**5.** 18 feet	**6.** 27 feet
7. 9 feet	**8.** 15 feet	**9.** 72 inches
10. 360 inches	**11.** 108 inches	**12.** 45 feet

C. Change the following to *inches:*

1. 24 yards	**2.** 9 feet	**3.** 24 feet
4. 108 feet	**5.** 27 yards	**6.** 15 yards
7. 4 feet	**8.** 13 yards	**9.** 6 feet
10. 2 yards	**11.** 12 feet	**12.** 12 yards

1. Mary's mother lacked $\frac{1}{4}$ yd. of lace for her dress. How many inches did she lack?

2. Lois needed 2 yds. and 9 inches of long cloth to make a cooking apron. How many yards did she need?

3. These pieces of cloth were used in making Henry's waist: collar 6 inches, sleeves $1\frac{1}{4}$ yd., cuffs 8 inches, front and back of waist 1 yd. and 24 inches. How many yards of cloth were used?

Problems

1. How many pints are there in 3 gallons?

2. Peggy went to the country for ten weeks' vacation. How many days was she gone?

3. Mother bought two quarts of June peas. What part of a peck did she buy?

4. Mrs. Brown bought $8\frac{1}{2}$ bushels of potatoes for winter use. How many quarts did she buy?

5. Miss Stowell made 26 gallons of cocoa for the cafeteria. How many pints did she make?

6. A basket of peaches contained $\frac{1}{4}$ of a bushel. How many pecks were there?

7. How many days are there in 52 weeks?

8. Billy's mother used 1 pint of cream in making 1 gallon of ice cream. What part of the gallon of ice cream was cream?

9. Martin's automobile holds 16 gallons of gasoline. How many quarts does it hold?

10. Bananas cost 30 cents a dozen. How many bananas could Mrs. Peck buy for one dollar?

11. John's father has 8 horses. Each horse was fed 6 quarts of oats twice daily. How many days would 480 quarts of oats last?

12. Mrs. Smith bought 1 quart of string beans, 1 quart of peaches, $\frac{1}{2}$ peck of spinach, and 1 pint of red raspberries from the grocer. Name the different measures which the grocer used in getting this order.

1. How many pecks are there in $\frac{1}{2}$ a bushel?

2. Steven sold 16 quarts of strawberries. How many pints did he sell?

3. From a board four yards long, John cuts a piece seven feet long. How long is the remaining piece?

4. From a box containing two pounds of pepper nine ounces are sold. How many ounces remain?

5. How many eggs are there in 5 dozen?

6. Find the cost of 5 lb. of candy at three cents an ounce.

7. John bought 8 ounces of candy. How many pounds did he buy?

8. How many dimes are there in one dollar?

9. Bernard's sister gave him five dollars in quarters for Christmas. How many quarters did he receive?

10. Miss Harris had 40 pupils in her class. At Christmas she gave each child 8 ounces of candy. How many pounds of candy did it take?

11. Mr. Brown had $2.50 in dimes. How many dimes did he have?

12. Ruth Small made the following deposit in the bank for the primary department of Hamilton Junior High School: $26 in bills, 80 half-dollars, 50 quarters, 82 dimes, 18 nickels, and 148 pennies. What was the total amount of her deposit?

13. Mrs. Walters bought $2\frac{1}{4}$ lb. of beef. How many ounces did she buy?

Short Written Tests

I. *Add and test by adding in a different order.* (3 minutes.)

1.	2.	3.	4.
8675	$63.19	$69.34	2903
432	4.28	4.80	98
19	3.09	90.07	376
387	48.70	.86	50
6143	9.68	4.30	488
296	3.51	7.19	79
84	4.82	.86	687
489	.98	38.04	9384

II. *Subtract and test by addition:*

1.	2.	3.	4.
$457.81	$894.35	9963	4830
39.48	296.27	8972	3892

III. *Multiply and test by division:*

1.	2.	3.	4.
$83.56	4321	5076	5879
19	409	128	376

IV. 1. $3\frac{7}{8} + 2\frac{1}{2}$ 2. $9\frac{7}{9} - 9\frac{2}{3}$

3. $6\frac{4}{5} = \frac{?}{5}$ 4. $\frac{3}{4} = \frac{?}{12}$

Mental Test

1. Add 6, 4, 7, 3, 5, 5, 9.
2. Add 38 and 46.
3. Take 35¢ from $1. What is the change?
4. The product is 130. One factor is 13. Find the other.
5. $\frac{1}{2} + \frac{2}{3} = ?$
6. $? + \frac{1}{2} = 2\frac{1}{2}$.
7. $\frac{2}{3} + ? = 1\frac{1}{3}$.
8. $12 \times ? = 108$.
9. $? \times 50 = 100$.
10. $? \div 8 = 9$.

Estimating Answers

It is often desirable to estimate carefully what the answer to a problem should be, without working it through. For example, Mr. Brant has 325 bushels of potatoes to sell, and he needs to know at once about what they are worth at 98 cents a bushel. He says, "98 cents is almost one dollar. So the potatoes are worth almost a dollar a bushel; 325 bushels are worth almost $325." If you were asked to find the exact value of 325 bushels of potatoes at 98¢ a bushel and should get $28 or $7340 for an answer, you would know, by estimating, that neither of these is the correct answer. *Remember that estimating is not merely guessing.* It is finding pretty nearly the correct result by using your reason, or "common sense," as it is sometimes called. It is well, always, to "check" your results by estimating, to determine whether or not the answer seems reasonable. If it is not reasonable, you had better look for a mistake.

Estimate the answers to the following questions, and then verify your estimates by actually performing the operations:

1. Find the cost of 11 books at 23¢ each.

2. Seven wagons cost $364. What is the cost of one?

3. A man has $121 and uses $76. How much has he left?

4. How many inches are there in $\frac{1}{3}$ of a foot?

5. How many quarts are there in $3\frac{1}{2}$ bushels?

6. What will 6 cows cost at $57 each?

7. At $6 each, how many articles can be bought for $72?

8. How many pecks are there in 49 quarts?

9. What will 11 gallons of oil cost at 13¢ a gallon?

10. What will 21 hens cost at 50¢ each?

Optional

A Fruit Stand

1. The bunches of bananas hanging in this fruit stand contain respectively 124, 96, 64, and 140 bananas. What is the total number of bananas?

2. Red bananas sell at the rate of 6 for 25 cents. What will 12 cost?

3. If the four bunches were bought at $2.45 per bunch, what did they all cost?

4. Mr. Scotese, the fruit dealer, bought 5 boxes of apples for $14.40. They average 100 apples per box. What does one apple cost the dealer?

5. He sold a dollar's worth of pears at the rate of 3 for 10 cents. How many pears did he sell?

6. If he should put the pears in baskets, 12 in each basket, and offer them to you at 35 cents a basket, or at the rate of 3 for 10 cents, which offer would you take?

7. Grape fruit are sold at 2 for 25¢. How many could I buy for 50 cents?

Business Problems

Optional

1. Mr. Scotese bought peaches at \$1 a basket and sold them at 15 cents a dozen. There were 10 dozen in a basket. What was his profit on 5 baskets of peaches?

2. What was his profit on 50 baskets of Delaware grapes bought at 12¢ a basket and sold at 18¢ a basket?

3. He bought chestnuts at \$6.40 a bushel and sold them at 40 cents a quart. What did he gain on a bushel?

4. Spanish shelled peanuts cost him \$11.20 a sack, each sack containing 140 pounds. He sold them at 20 cents a pound. What was the profit on a sack?

5. He bought 50 watermelons at 23 cents apiece and sold them at 40 cents apiece. What was his profit?

6. He paid \$8 a hundred for cantaloupes and sold them for 12 cents apiece. How much did he gain on a hundred?

7. John earned \$6$\frac{3}{4}$ one week, \$8 the second, and \$7$\frac{1}{4}$ the third. What was his average earning for a week?

8. How many pounds of sugar at 7 cents a pound are equal in value to 6 dozen eggs at 35 cents a dozen?

9. What profit does a boy make in one month if he sells 20 *Posts* a week at 5¢ a copy and 10 *Journals* at 15¢ a copy, when the *Post* costs 3¢ a copy and the *Journal* 11¢?

10. If gasoline costs 24¢ a gallon and it takes one gallon of gasoline to run an automobile 20 miles, how much would it cost to run a distance of 100 miles?

11. What is the expense of my automobile for gasoline, oil, and repairs for three years at \$25 a month?

Mental Tests

1

1. Name the odd numbers between 10 and 15.
2. $25 + 6 + 9 = ?$
3. What is $\frac{1}{2}$ of 36?
4. 40 quarts = how many gallons?
5. $32 \times 10 = ?$
6. Divide 110 by 10.
7. $45 - 10 = ?$
8. What part of 20 is 4?
9. Change 10 ft. to inches.
10. How many pencils at 3¢ each can be bought for 30¢?

2

1. Write the even numbers between 15 and 20.
2. How many 6's are there in 72?
3. Which is greater, 5×7 or 6×6?
4. What is the remainder when 50 is divided by 7?
5. What part of a dollar is 25¢?
6. Find the cost of 20 bushels of wheat at two dollars a bushel.
7. $99 \div 9 = ?$
8. $99 - 20 = ?$
9. $87 \times 10 = ?$
10. $51 + 10 + 5 = ?$

3

1. Write 91 in Roman numerals.
2. Find $\frac{1}{4}$ of \$44.
3. How much is 12×11?
4. $85 - 30 = ?$
5. $144 \div 12 = ?$
6. How many ounces are there in a pound?
7. What part of a foot is 6 inches?
8. What must be paid for 5 chairs at \$12 each?
9. What is the remainder when 64 is divided by 9?
10. A man spends \$8 of the \$15 he had with him. How many dollars has he left?

4

1. How many 12's are there in 120?
2. Change 6 feet to inches.
3. 3 in. is what part of a foot?
4. What is $\frac{1}{4}$ of 48?
5. $50 \times 6 = ?$
6. $52 - 50 = ?$
7. Write 88 in Roman numerals.
8. $60 \div 5 = ?$
9. $8 \times \frac{1}{2} = ?$
10. What is the remainder when 66 is divided by 8?

5

1. Write in figures; six million, four hundred thousand.
2. Write XCVII in Arabic.
3. $49 + 7 + 3 + 6 + 4 = ?$
4. $36 - 16 = ?$
5. $23 + 27 = ?$
6. $63 - 37 = ?$
7. What will 12 bushels of oats cost at 50¢ a bushel?
8. If there are 60 bushels of potatoes in one bin and 35 bushels in another, how many bushels are there in the two bins?
9. Find $\frac{1}{6}$ of 66.
10. Change 60 inches to feet.

6

1. Write in figures; nine millions, six hundred five thousand, four hundred three.
2. Write 93 in Roman numerals.
3. $37 + 5 + 5 + 8 + 2 = ?$
4. $57 - 17 = ?$
5. $44 + 36 = ?$
6. $52 - 28 = ?$
7. A board four feet long is divided into 8 equal parts. How long is each part?
8. At eleven dollars each, how many chairs can be bought for $66?

9. A house costing $6000 is sold for $7000. What was the gain?
10. What part of 20 is 4?

7

1. Write in figures; three million, three thousand, three hundred nine.
2. Write LXXXIX in Arabic.
3. $64 + 1 + 9 + 4 + 6 = ?$ 4. $83 - 23 = ?$
5. $19 + 31 = ?$ 6. $76 - 29 = ?$
7. A board four feet long is divided into six equal parts. How many inches long is each part?
8. Change four gallons to pints.
9. How many feet are there in 120 inches?
10. How many weeks are there in a month of 28 days?

8

1. Write in figures; eight thousand, three hundred seventy-five.
2. Write 78 in Roman numerals.
3. $18 + 2 + 5 + 5 + 3 + 7 = ?$ 4. $78 - 28 = ?$
5. $46 + 34 = ?$ 6. $84 - 36 = ?$
7. What part of 36 is 9?
8. What must be paid for two gallons of milk at 10 cents a quart?
9. What must be added to 21 to make 30?
10. An overcoat costing $29 is sold for $25. What was the loss?

9

1. Multiply $.50 by 4. 2. Divide 63 by 3.
3. How many quarts are there in three pecks?
4. Twelve tons of hay sold for $120. What was the price of one ton?

5. Find $\frac{2}{5}$ of 20. 6. $6 \times ? = 66$.
7. It is 28 miles from Syracuse to Fulton and 15 miles from Fulton to Oswego. How much farther is it from Fulton to Syracuse than from Fulton to Oswego?
8. Write the division table of 9's.
9. What will one dozen lemons cost at 6 cents each?
10. Change three gallons to pints.

10

1. Multiply \$.20 by 4. 2. Divide 48 by 2.
3. Change 16 pints to quarts.
4. Eight bags of cement cost \$16. What was the cost of one bag?
5. What is $\frac{3}{5}$ of 25? 6. $7 \times ? = 63$.
7. I hire two men at \$6 a day each, and a team at \$4. How much for 6 days do they cost me?
8. Write the division table of 7's.

11

1. Multiply \$.25 by 8. 2. Divide 124 by 4.
3. What is the average of 79, 80, 81?
4. A house rented for \$60 for three months. What was the rent for a month?
5. Find $\frac{3}{4}$ of 20. 6. $9 \times ? = 72$.
7. Edward has earned \$16. How much more does he need to buy a \$20 suit of clothes?
8. Milton's breakfast consisted of milk at 6 cents, an egg at 4 cents, oatmeat at 3 cents, and bread and butter at 6 cents. How much did his breakfast cost?
9. How many feet are there in 8 yards?
10. Change 32 ounces to pounds.

12

1. Multiply \$.35 by 10. 2. Divide 69 by 3.
3. What is the average of 91, 90, 89?
4. If four cases of eggs sell for \$32, what does one case bring?
5. What is $\frac{2}{3}$ of 18? 6. $11 \times ? = 77$.
7. Donald sold 48 *Saturday Posts* one week and 44 the next week. How many more did he sell the first week than the second?
8. Find the cost of six oranges at 4 cents each.
9. How many weeks are there in 35 days?
10. If John feeds his horse a peck of oats a day, how long will two bushels last?

13

1. Divide 96 by 3.
2. What is the average of 85, 83, 87?
3. The numerator of a fraction is 4 and the denominator is 7. Write the fraction.
4. $4\frac{1}{2} + 6\frac{1}{2} = ?$ 5. $\frac{4}{5}$ of $35 = ?$
6. There were 100 bananas in a bunch. After 68 of them had been sold, how many bananas were left?
7. At 48¢ a pound what will 9 ounces of butter cost?
8. Find the cost of $1\frac{1}{2}$ dozen eggs at 40¢ a dozen.
9. How many gallons are there in 44 quarts?
10. When you can buy 3 grapefruit for 25¢, what is the cost of one?

14

1. Divide 497 by 7.
2. What is the average of 87, 93, 90?
3. How are numbers smaller than one expressed?

4. $\frac{1}{2}$ of a foot + $\frac{1}{4}$ of a foot equal how many inches?
5. $\frac{1}{4}$ is what part of $\frac{2}{4}$? 6. Multiply 83 by 1000.
7. Divide 9200 by 100.
8. At 6¢ a pint what will two quarts of milk cost?
9. Robert earned 90¢ and spent 60¢. How much had he left?
10. How many quarts are there in $\frac{1}{8}$ of a bushel?

15

1. Divide 819 by 9.
2. What is the average of 86, 88, 87?
3. Write eighty twenty-thirds.
4. What is the remainder when 57 is divided by 7?
5. $2\frac{1}{4} + 3\frac{2}{4} = ?$ 6. $\frac{2}{4}$ is what part of $\frac{3}{4}$?
7. The milkman buys milk at 8 cents a quart and sells it at 6 cents a pint. What does he gain on three pints?
8. Write a number less than 10 and greater than 8.
9. What part of a yard is 24 inches?
10. Change ten bushels to quarts.

Tests of Accomplishment

I

1. Add 9375 + 5786

2. Subtract 9281 − 6395

3. Multiply 5083 by 581

4. $61\overline{)5722}$

5. Change 10 bushels to quarts.

II

1. What part of a yard is 9 inches?

2. Fifty boys buy a basket ball together. If the price of the ball is $5, what is each boy's share?

3. At $2 each, how many tickets can be bought for $86?

4. What must be paid for a bushel of peaches at $1.00 for a peck?

5. The sales of a store for five months were $19,150; $24,375; $20,893; $19,065; $21,932. What were the total sales for the five months?

III

1. Find the cost of 407 autos at $550 each.

2. Write 98 in Roman numerals.

3. Write 805,683 in words.

4. Divide seven thousand thirty-five by nineteen.

5. Find twenty-three times nine hundred nine.

IV

1. A wagon weighs 1440 pounds and the load weighs 3570 pounds. Find the weight of both.

2. A bushel of wheat weighs 60 pounds. What will 130 bushels weigh?

3. A house is bought for $4000 and sold for $5000. What is the gain?

4. How many autos at $550 each can be bought for $1100?

5. Change five yards to inches.

V

1. Add $\frac{1}{6}$, $\frac{5}{9}$, and $\frac{1}{3}$.

2. How many fourths are required to make nine twelfths?

3. Two fifths and what fraction are eleven twentieths?

4. Twelve hundred pounds is what part of a ton?

5. Change five sevenths to forty-ninths.

VI

1. How many oranges are there in $\frac{5}{6}$ of a dozen?

2. One third of the lumber in a certain pile is pine, one fourth is hemlock, one eighth is chestnut, and the remainder is hard wood. What fractional part of the whole is hard wood?

3. Change 20 quarts to the fractional part of a bushel.

4. Which is larger and how much, $\frac{5}{8}$ or $\frac{3}{5}$?

5. Three sevenths and what fraction are nineteen thirty-fifths?

VII

1. Add $8\frac{3}{7}$, $5\frac{1}{3}$, and $11\frac{5}{7}$.

2. A farmer buys $2\frac{1}{4}$ tons of corn, $1\frac{3}{10}$ tons of bran, and $5\frac{4}{5}$ tons of corn meal. How many tons did he buy in all?

3. What part of 45 is 9?

4. Write 9 divided by 12 as a fraction in lowest terms.

5. Write 22 divided by 7 as a mixed number.

VIII

1. Subtract the sum of $\frac{1}{7}$ and $\frac{4}{14}$ from 1.

2. Which is larger and how much, $\frac{2}{3}$ or $\frac{7}{11}$?

3. What part of 45 is 27?

4. Write 37 divided by 7 as a mixed number.

5. Write twenty-four over forty as a fraction in its lowest terms.

IX

1. Find the L. C. M. of 3, 5, and 10.

2. Add $\frac{1}{3}$, $\frac{2}{5}$, and $\frac{3}{10}$. 3. $\frac{1}{4} - \frac{1}{8} = ?$

4. A farm is divided into three fields, one contains $7\frac{1}{4}$ acres, another $12\frac{3}{4}$ acres, and the third $31\frac{3}{5}$ acres. How many acres are there in the farm?

5. How much larger is the second field, in example 4, than the first?

6. How much larger is the third field, in example 4, than the sum of the first and second?

7. James added $3\frac{1}{5}$, $7\frac{1}{2}$, $2\frac{3}{4}$, and $\frac{3}{4}$. His answer was 14. What should it have been?

8. Fred earned $\$3\frac{1}{5}$ and spent $\$2\frac{3}{4}$ of it for clothes. How much had he left?

9. How many \$14 coats can be bought for \$154?

10. Find the cost of 19 sleds at \$3 each.

X

1. Find the L. C. M. of 7, 3, and 6.

2. Add $\frac{2}{7}$, $\frac{2}{3}$, and $\frac{5}{6}$. 3. $\frac{4}{7} - \frac{2}{4} = ?$

4. From a car containing 20 tons of grain three loads are sold. The first was $2\frac{1}{4}$ tons, the second $2\frac{1}{2}$ tons, and the third $1\frac{5}{8}$ tons. How many tons were sold?

5. How many tons remained in the car?

6. How much larger was the first load than the last?

7. A garden is $7\frac{1}{2}$ rods long and $4\frac{1}{4}$ rods wide. How many rods is it around the garden?

8. Find the cost of 8 tons of grain at $37 a ton.

9. How many lawn mowers at $6 each can be bought for $186?

10. Find the sum of $8\frac{1}{2}$ yards, $6\frac{3}{4}$ yards, $7\frac{1}{8}$ yards, and $6\frac{7}{8}$ yards.

The "One Hundred" Record

Names of All Pupils in Class	Multiplication Table	Long Division	Multiplication by Three Figures	Difficult Subtraction	Reduction to Lowest Terms	Reduction of Mixed Numbers	Adding Fractions	Subtracting Fractions	Multiplying Fractions	Dividing Fractions	Factors and Products	Seeing Relations	Making Problems	Measures	Tables
Raymond Oldt	x	x			x		x								
Rose Kapfer	x	x													
Sidney Sands	x		x			x									
Sarah Archer	x			x			x								
Fred Leary	x	x	x		x				x						

Place this form on the blackboard, or on a large card hung upon the wall. Enter all names at the beginning. Permit children to come and ask for a test in any topic before or after school or at other times designated by the teacher. Check the topic as soon as a perfect test has been made.

The above record shows that Sidney Sands has made perfect tests in Multiplication Table, Multiplication by Three Figures, and Reduction of Mixed Numbers.

This plan promotes friendly rivalry, fixes responsibility upon the pupil, and encourages pupils to overcome one difficulty at a time.

When one list is completed, add other topics, or begin a new one. It is well to start with a small list.

By reference to the blank spaces, both teacher and pupil may see at a glance where the pupil's weak spots are, and where "individual" work is necessary. Always provide some very easy topics, so that the poorest scholar may make a start.

I. *Add and test by adding in a different order. Can you finish in five minutes?*

1.	2.	3.	4.
3288	\$9.60	\$8.15	\$77.19
796	7.29	3.98	5.82
905	8.48	4.86	93.70
3086	.99	18.23	6.08
4579	7.38	10.09	7.83
480	6.09	6.06	28.42
739	1.08	70.30	7.86

II. *Subtract:*

1.	2.	3.	4.
1398	\$14.67	\$28.32	\$6.87
609	9.99	19.23	.89

III.
1. 2481×329.
2. 7206×702.
3. 1930×620.
4. 839×900.
5. 207×6800.

IV.
1. \$379.60 − \$239.87.
2. 52,006 − 42,009.
3. 63,421 − 7381.
4. 9307 − 8798.
5. 72,860 − 68,462.

V.
1. $81{,}385 \div 397$.
2. $81{,}385 \div 205$.
3. $362{,}141 \div 89$.
4. $431{,}072 \div 709$.
5. $431{,}072 \div 608$.

VI. *Find the quotients:*

1. $\frac{355995}{81}$
2. $\frac{642510}{726}$
3. $\frac{2610580}{643}$
4. $\frac{359072}{49}$
5. $\frac{245754}{246}$

Drill Table

The table on the following page gives a multitude of examples for drill on the fundamental operations.

Notation and Numeration —

1. Read the numbers in columns. Read across the page.

2. Let one pupil read numbers for the rest of the class to write at the board.

Addition and Subtraction —

1. Dictate numbers for pupils to add or subtract.

2. Let pupils add without copying. Assign by group and column as " Group A, Col. M."

Multiplication and Division —

1. Dictate numbers from the table for pupils to multiply or divide.

Every number is exactly divisible by the numbers before it. Dictate any number for a divisor, and any number at the right for a dividend. The quotient will be an integer. For inexact division dictate numbers from different lines.

Key

	I	J	K	L	M	N
A		5	7	9	11	13
B		4	6	8	10	12
C		3	6	9	12	15
D		2	5	7	9	14
E		6	8	10	12	9
F		2	7	4	9	11

Explanation

Every number in Col. I, Group A, is contained in the first following number 5 times, in the next one 5×7 (35) times, in the next $5 \times 7 \times 9$ (315) times, and so on. A complete list of quotients is in the list of answers. For multiplication, dictate a number and a key number following it. The product will be at the right of the number dictated. For example, dictate 552 (Col. K, Group B), and 8 (key). The product is 4416.

Drill Table

		I	J	K	L	M	N
A	1.	19	95	665	5985	65835	855855
	2.	18	90	630	5670	62370	810810
	3.	17 5	85 7	595 9	5355 11	58905 13	765765
	4.	16	80	560	5040	55440	720720
	5.	14	70	490	4410	48510	630630
B	1.	24	96	576	4608	46080	552960
	2.	23	92	552	4416	44160	529920
	3.	22 4	88 6	528 8	4224 10	42240 12	506880
	4.	21	84	504	4032	40320	483840
	5.	20	80	480	3840	38400	460800
C	1.	31	93	558	5022	60264	903960
	2.	29	87	522	4698	56376	845640
	3.	28 3	84 6	504 9	4536 12	54432 15	816480
	4.	27	81	486	4374	52488	787320
	5.	26	78	468	4212	50544	758160
D	1.	49	98	490	3430	30870	432180
	2.	41	82	410	2870	25830	361620
	3.	39 2	78 5	390 7	2730 9	24570 14	343980
	4.	37	74	370	2590	23310	326340
	5.	33	66	330	2310	20790	291060
E	1.	16	96	768	7680	92160	829440
	2.	15	90	720	7200	86400	777600
	3.	13 6	78 8	624 10	6240 12	74880 9	673920
	4.	11	66	528	5280	63360	570240
	5.	9	54	432	4320	51840	466560
F	1.	47	94	658	2632	23688	260568
	2.	44	88	616	2464	22176	243936
	3.	38 2	76 7	532 4	2128 9	19152 11	210672
	4.	35	70	490	1960	17640	194040
	5.	32	64	448	1792	16128	177408

STANDARDIZED TEST — ADDITION

Pupils completing the fourth grade should be able to write the answers to 4 of the examples given below in six minutes. Fifth grade pupils should be able to do 6 examples.

7862	6809	8941	5917	6772
5013	7623	7910	4814	6028
1761	5299	9845	9007	6535
5872	6701	8522	6975	2340
3739	3496	1046	1227	2319

7864	1249	8758	2462	1247
7883	8975	2350	9869	3573
8240	9005	3197	4572	1081
9869	1573	2338	6420	7805
6794	3203	5917	6772	9864

4319	6794	3293	7917	2914
2358	5420	7805	4304	9587
5795	4570	7642	9027	5009
4314	8028	7803	9975	5317
1249	8758	2462	1247	2303

STANDARDIZED TEST — SUBTRACTION

Pupils completing the fourth grade should be able to write the answers to 7 of the examples given below in two minutes. Fifth grade pupils should be able to do 11 examples.

739	1852	975	1087	516
367	948	906	821	239
962	508	1371	1284	730
325	447	843	966	508
1853	897	1910	735	1056
162	258	361	478	591
877	1190	619	831	954
618	739	257	360	483
1077	1328	939	1316	919
704	872	654	837	335

STANDARDIZED TEST — MULTIPLICATION

Pupils completing the fourth grade should be able to write the answers to 4 of the examples given below in twelve minutes. Fifth grade pupils should be able to do 9 examples.

8745 × 92	7851 × 36	9264 × 47	6054 × 58
6592 × 64	1362 × 23	4678 × 89	7029 × 75
2315 × 76	3657 × 38	7638 × 53	4259 × 49
2684 × 85	7953 × 29	5379 × 27	6824 × 64

STANDARDIZED TEST — DIVISION

Pupils completing the third grade should be able to write the answers to 16 of the examples given below in one minute. Fourth grade pupils should be able to do 23 examples.

$3\overline{)9}$	$7\overline{)28}$	$4\overline{)32}$	$9\overline{)9}$	$6\overline{)36}$	$3\overline{)21}$
$2\overline{)0}$	$6\overline{)48}$	$1\overline{)1}$	$7\overline{)63}$	$5\overline{)10}$	$6\overline{)0}$
$2\overline{)6}$	$8\overline{)32}$	$4\overline{)24}$	$1\overline{)8}$	$5\overline{)30}$	$1\overline{)7}$
$8\overline{)72}$	$2\overline{)10}$	$1\overline{)0}$	$7\overline{)42}$	$9\overline{)36}$	$1\overline{)1}$
$6\overline{)18}$	$1\overline{)3}$	$3\overline{)6}$	$2\overline{)8}$	$4\overline{)20}$	$6\overline{)6}$
$7\overline{)49}$	$3\overline{)27}$	$8\overline{)64}$	$3\overline{)24}$	$1\overline{)2}$	$9\overline{)63}$
$4\overline{)16}$	$2\overline{)4}$	$5\overline{)0}$	$8\overline{)24}$	$7\overline{)7}$	$7\overline{)21}$
$2\overline{)18}$	$4\overline{)4}$	$6\overline{)42}$	$3\overline{)15}$	$3\overline{)0}$	$9\overline{)81}$

STANDARDIZED TEST — DIVISION

Pupils completing the fourth grade should be able to do correctly 4 of the examples given below in six minutes. In general these examples are too difficult for third grade pupils. Copy each example as you do it.

$8\overline{)3840}$	$4\overline{)7432}$	$7\overline{)2534}$	$3\overline{)8430}$
$6\overline{)4680}$	$9\overline{)8577}$	$2\overline{)6370}$	$5\overline{)9310}$
$8\overline{)7512}$	$4\overline{)3820}$	$7\overline{)9653}$	$6\overline{)6720}$
$9\overline{)5373}$	$2\overline{)5130}$	$6\overline{)7188}$	$9\overline{)2142}$
$5\overline{)4350}$	$3\overline{)2616}$	$7\overline{)3038}$	$3\overline{)5781}$

STANDARDIZED TEST — DIVISION

Pupils completing the fourth grade should be able to write the answers to 5 of the examples given below in twenty minutes. Fifth grade pupils should be able to do 13 examples.

Copy these examples as you do them.

82)3854	43)1591	74)2664	31)1953
63)3591	94)4042	21)1344	53)4452
83)5312	42)672	71)5183	32)2304
62)2108	93)5022	23)782	51)2703
84)7140	41)3567	73)6278	33)1386
64)5312	92)6624	24)984	52)3484

SUBTRACTION METHODS

For the convenience of teachers, three methods of subtraction are here illustrated.

Continental (Austrian) Method

42.96
9.27
33.69

Say, "7 and **9** are 16
3 and **6** are 9
9 and **3** are 12
1 and **3** are 4"

In this method we consider subtraction the converse of addition, the *language of addition* is employed, and "carrying" is done as in addition.

It is also called the "making change" method and the method of "complementary addition."

Equal Addition Method

42.96
9.27
33.69

Say, "7 from 16 leaves **9**
3 from 9 leaves **6**
9 from 12 leaves **3**
1 from 4 leaves **3**"

In this method the carrying is explained by saying "having added 10 to 6 to make it 16, we must add 10 (1 ten) to 2 making it 3," etc. The method is based upon the axiom "If the same number be added to each of two numbers, their difference is not changed." It is also called the "borrow and pay back" method.

Disintegration Method

42.96
9.27
33.69

Say, "7 from 16 leaves **9**
2 from 8 leaves **6**
9 from 12 leaves **3**
0 from 3 leaves **3**"

In this method we "disintegrate" the minuend.

TO THE TEACHER. — The application of the various subtraction methods to operations with mixed numbers is here illustrated.

The pupil should be drilled in but *one* of these. There are advantages in continuing the one already learned.

Continental (Austrian) Method.

4 Say "$\frac{1}{3}$ and $\frac{2}{3}$ (writing $\frac{2}{3}$) $= 1$ ($\frac{2}{3}$)."
$2\frac{1}{3}$ Carry 1 to 2 and call it 3.
$1\frac{2}{3}$ *Difference.* Say "3 and 1 (writing 1) $= 4$."

Equal Addition Method.

$4 + \frac{2}{3} = 4\frac{2}{3}$ Say "$\frac{1}{3}$ from $\frac{2}{3} = \frac{1}{3}$." Write $\frac{1}{3}$.
$2\frac{1}{3} + 1 = 3\frac{1}{3}$ Say "3 from 4 $= 1$." Write 1.
$1\frac{1}{3}$ *Difference.*

Disintegration Method.

$4 = 3\frac{3}{3}$ Say "$\frac{1}{3}$ from $\frac{2}{3} = \frac{1}{3}$." Write $\frac{1}{3}$.
$2\frac{1}{3} = 2\frac{1}{3}$ Say "2 from 3 $= 1$." Write 1.
$1\frac{1}{3}$ *Difference.*

Continental (Austrian) Method.

$4\frac{1}{4} = 4\frac{3}{12}$ Say "$\frac{4}{12}$ and $\frac{11}{12}$ (writing $\frac{11}{12}$) $= \frac{15}{12}$" ($1\frac{3}{12}$).
$2\frac{1}{3} = 2\frac{4}{12}$ Carry 1 to 2, making it 3.
$1\frac{11}{12}$ *Difference.* Say "3 and 1 (writing 1) $= 4$."

Equal Addition Method.

$4\frac{1}{4} = 4\frac{3}{12}$ $4\frac{3}{12} + \frac{8}{12} = 4\frac{15}{12}$
$2\frac{1}{3} = 2\frac{4}{12}$ $2\frac{4}{12} + 1 = 3\frac{4}{12}$
$1\frac{11}{12}$ *Difference.*
Say "$\frac{4}{12}$ from $\frac{15}{12} = \frac{11}{12}$." Write $\frac{11}{12}$.
Say "3 from 4 $= 1$." Write 1.

Disintegration Method.

$4\frac{1}{4} = 4\frac{3}{12} = 3\frac{15}{12}$
$2\frac{1}{3} = 2\frac{4}{12} = 2\frac{4}{12}$
$1\frac{11}{12}$ *Difference.*
Say "$\frac{4}{12}$ from $\frac{15}{12} = \frac{11}{12}$." Write $\frac{11}{12}$.
Say "2 from 3 $= 1$." Write 1.

1. Contests in addition and subtraction are good. Two pupils go to the blackboard. An example is given. The one who gets the correct answer first, wins. The other sits down. The winner chooses another and yet another. If he wins 3, he scores 5 points and sits until it is his turn again.

2. To make addition interesting: Let each child play he is shopping and has bought three, four, or five articles, and is to find out the total cost. Each child thus originates his own problem.

3. Visualize combinations: Children are shown a group of 3 or 4 combinations for an instant and required to give the answers.

4. In using the table on page 2, load a freight train and see who can first reach Albany or Buffalo, or some town with which pupils are familiar. Some will be slow freight, but all will try to have a fast train. Vary the exercise by suggesting that any mistake is a wreck (pupil engineer responsible) and disqualifies the engineer until his turn to recite again. Have mail trains, express trains carrying fruit, etc. Great help in subtraction drill also.

5. Put figures on board in column. Pupils add silently as placed on board. As soon as the last figure is placed, erase the column. Ask for answer.

6. Write several combinations on the board about a yard apart, *e.g.*

3	6	5
4	8	9

1st pupil follows, writing the sums.
2d pupil checks and erases an addend.
3d pupil writes in the addend.
4th pupil checks and erases the other addend.
5th pupil writes in the addend.
6th pupil checks and erases the sums, etc.
Several pupils may thus be working at the same time.

7. Relay race:

Divide blackboard into as many spaces as there are rows of desks. In each space place simple number combinations in addition, or subtraction.

$3+3=$	$5+2=$
$2+4=$ etc.	$2+9=$ etc.

Give crayon to leaders in each row. Leader writes first result, hands crayon to next, who writes next and corrects any error, and so on. The row having all correct in the shortest time wins the race. This is a good game to use with multiplication facts also.

1.

$5 \times ? = 20$	30	40	50	35	15	45	25	55	10
$6 \times ? = 18$	54	24	12	60	72	48	42	66	30

Teacher points to product and pupil gives the other factor.

2. Snowball battle: Pupils are arranged on two opposing sides, each under a captain. The snowballs are number combinations, such as: $\frac{1}{3}$ of 15; $\frac{1}{4}$ of 20; 4×12. Each player "throws" in turn, the sides alternating. If one is "hit," the captain of the opposing side may choose one of the players from the side on which the error was made.

3. Place drawing of a snow fort on the board, and upon it write figures from 1 to 12, but not in succession. On the flag write the multiplier. Children hit the fort as many times as they give correct answer.

4. Addition: Place column of figures on board, writing slowly at first, and see how many will get the right answer as soon as the column is completed. This can be made to produce quick and accurate work in addition.

5. *Keep daily record of work*, on blackboard where children can see it, *averaging* at the end of each week.

6. Estimate distances in feet and yards. Lay off on the floor a line 9 ft. long. Stand 9 ft. or 15 ft. from a given person or object. Play at taking pictures of persons or objects at 10, 15, 25 ft., etc.

7. Measurement drill: Pass rulers to pupils in first row. They pass to board and draw a line the length indicated by teacher as 2″, 5″, 3″, 4″, 6″. Require rapid work. Face about when through.

Teacher: "How long is your line and how long would it be if it were two times as long?" *Child:* "My line is 6″ long. If it were 2 times as long, it would be 12″ long." Rulers passed to second row, etc.

8. Write a series of combinations on the blackboard about 3 feet apart.

2	3	6	5	6	
8	5	7	6	4	etc.

First pupil writes the *products*. Second pupil checks and erases the *multipliers*, following the first pupil closely. Third pupil writes multiplier in again. Fourth pupil checks and erases *multiplicands*. Fifth pupil writes in multiplicands. Sixth pupil checks and erases products.

Three or four pupils may be at work at the same time, following one another. This is good preparation for division facts.

1. A race to win 10's. Children at seats with paper and pencil. Teacher directs them to solve a problem in the arithmetic or one she places on the board. When done, teacher inspects it, gives pupil a 10 if correct. Child at once begins work on another problem selected by teacher. Whoever receives most 10's wins.

2. One child chooses, for instance, the combination $6 \times 3 = 18$ in the 6 table, goes to the board, takes chalk, and announces to the class: "I am a child of the 6 family. Can you guess my name?" Perhaps the first pupil answers, "Are you $6 \times 7 = 42$?"

"No, I am not $6 \times 7 = 42$," responds the child, placing that combination on the board.

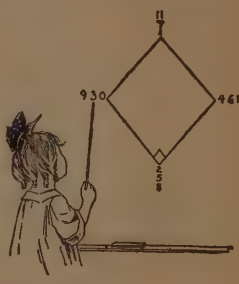
"Are you $6 \times 9 = 54$?" asks the next.

"No, I'm not $6 \times 9 = 54$," answers the child, placing that combination on the board under the other.

When the right answer is given, the child answers, "Yes, I am $6 \times 3 = 18$," places the combination on the board, and gives the chalk to the successful child, who continues the game.

3. Game of ninepins: Nine pupils stand in a row before the class. The first player asks of one of the ninepins an arithmetic question. The questions may be limited to any part of the work in which a rapid review or test is desired. If one of the ninepins is "hit" (fails to answer correctly), the player may try again, and the one "hit" must take his seat.

4. A baseball game: Divide the class into A and B sides. Appoint a pitcher and catcher for each side. The A pitcher takes the pointer, and "pitches a ball" by saying, "Multiply by 9," then points to one number at each base from 1st to home. The first pupil on B side stands and answers as pitcher points. Pitcher may give a different question to each player; as, "Add 6," "Subtract from 15," etc. If answers are all correct, a "home run" has been made, and next one on B side recites. If a mistake is made, the A catcher must discover it. Then it is one "out," and next B player "goes to bat." If mistake is not discovered by A catcher, the run counts. When there are three "outs," the side is out, and the other side has an inning. Nine "innings" decide the game. This can be made a very spirited game.



Apartment House Game

Draw a diagram like this on the blackboard for any of the multiplication tables, for example, the 5's.

Door Plates	Families
5×0	0, 1, 2, 3, 4
5×1	5, 6, 7, 8, 9
5×2	10, 11, 12, 13, 14
5×3	15, 16, 17, 18, 19
etc. to end of table.	

The teacher inserts the numbers as pupils dictate. If she is teaching the "5" families she puts 5×0 under the heading "door plates" and asks, "Who lives in this apartment?"

Pupil: "The five times zero family."

Teacher: "Name the five times zero family."

Pupil: "0, 1, 2, 3, 4." Teacher writes 0, 1, 2, 3, 4.

Teacher writing 5×1. "Who lives in the next apartment?"

Pupil: "The 5 times 1 family."

Teacher: "Name the 5×1 family."

Pupil: "5, 6, 7, 8, 9." Teacher writes 5, 6, 7, 8, 9.

Continue this to 5×10.

Write the even dividends, *0, 5, 10, 15,* etc. in large figures. They are the products already learned in the multiplication table. The large numbers are the mothers of the families. The small numbers are the children. There are just 5 people in each family.

Teacher: "How many times is 5 contained in zero?"

Pupil: "Five is in zero no times."

Teacher: "How many times is 5 contained in 1?"

Pupil: "Five is in 1 no times, and 1 over."

Teacher: "How many times is 5 contained in 2?"

Pupil: "Five is in 2 no times and 2 over."

Continue through the other tables.

Note that the small figures are dividends that have remainders, and it is to help to master these, that this device is given. Drill so thoroughly on the tables that pupils can give at random the *quotient and remainder* in uneven dividends, as quickly as in even dividends. As soon as this is accomplished further use of the device may be abandoned.

The Multiplication Table

2 × 1 = 2	3 × 1 = 3	4 × 1 = 4	5 × 1 = 5
2 × 2 = 4	3 × 2 = 6	4 × 2 = 8	5 × 2 = 10
2 × 3 = 6	3 × 3 = 9	4 × 3 = 12	5 × 3 = 15
2 × 4 = 8	3 × 4 = 12	4 × 4 = 16	5 × 4 = 20
2 × 5 = 10	3 × 5 = 15	4 × 5 = 20	5 × 5 = 25
2 × 6 = 12	3 × 6 = 18	4 × 6 = 24	5 × 6 = 30
2 × 7 = 14	3 × 7 = 21	4 × 7 = 28	5 × 7 = 35
2 × 8 = 16	3 × 8 = 24	4 × 8 = 32	5 × 8 = 40
2 × 9 = 18	3 × 9 = 27	4 × 9 = 36	5 × 9 = 45
2 × 10 = 20	3 × 10 = 30	4 × 10 = 40	5 × 10 = 50
2 × 11 = 22	3 × 11 = 33	4 × 11 = 44	5 × 11 = 55
2 × 12 = 24	3 × 12 = 36	4 × 12 = 48	5 × 12 = 60
6 × 1 = 6	7 × 1 = 7	8 × 1 = 8	9 × 1 = 9
6 × 2 = 12	7 × 2 = 14	8 × 2 = 16	9 × 2 = 18
6 × 3 = 18	7 × 3 = 21	8 × 3 = 24	9 × 3 = 27
6 × 4 = 24	7 × 4 = 28	8 × 4 = 32	9 × 4 = 36
6 × 5 = 30	7 × 5 = 35	8 × 5 = 40	9 × 5 = 45
6 × 6 = 36	7 × 6 = 42	8 × 6 = 48	9 × 6 = 54
6 × 7 = 42	7 × 7 = 49	8 × 7 = 56	9 × 7 = 63
6 × 8 = 48	7 × 8 = 56	8 × 8 = 64	9 × 8 = 72
6 × 9 = 54	7 × 9 = 63	8 × 9 = 72	9 × 9 = 81
6 × 10 = 60	7 × 10 = 70	8 × 10 = 80	9 × 10 = 90
6 × 11 = 66	7 × 11 = 77	8 × 11 = 88	9 × 11 = 99
6 × 12 = 72	7 × 12 = 84	8 × 12 = 96	9 × 12 = 108

The Division Table

2 ÷ 2 = 1	3 ÷ 3 = 1	4 ÷ 4 = 1	5 ÷ 5 = 1
4 ÷ 2 = 2	6 ÷ 3 = 2	8 ÷ 4 = 2	10 ÷ 5 = 2
6 ÷ 2 = 3	9 ÷ 3 = 3	12 ÷ 4 = 3	15 ÷ 5 = 3
8 ÷ 2 = 4	12 ÷ 3 = 4	16 ÷ 4 = 4	20 ÷ 5 = 4
10 ÷ 2 = 5	15 ÷ 3 = 5	20 ÷ 4 = 5	25 ÷ 5 = 5
12 ÷ 2 = 6	18 ÷ 3 = 6	24 ÷ 4 = 6	30 ÷ 5 = 6
14 ÷ 2 = 7	21 ÷ 3 = 7	28 ÷ 4 = 7	35 ÷ 5 = 7
16 ÷ 2 = 8	24 ÷ 3 = 8	32 ÷ 4 = 8	40 ÷ 5 = 8
18 ÷ 2 = 9	27 ÷ 3 = 9	36 ÷ 4 = 9	45 ÷ 5 = 9
20 ÷ 2 = 10	30 ÷ 3 = 10	40 ÷ 4 = 10	50 ÷ 5 = 10
22 ÷ 2 = 11	33 ÷ 3 = 11	44 ÷ 4 = 11	55 ÷ 5 = 11
24 ÷ 2 = 12	36 ÷ 3 = 12	48 ÷ 4 = 12	60 ÷ 5 = 12
6 ÷ 6 = 1	7 ÷ 7 = 1	8 ÷ 8 = 1	9 ÷ 9 = 1
12 ÷ 6 = 2	14 ÷ 7 = 2	16 ÷ 8 = 2	18 ÷ 9 = 2
18 ÷ 6 = 3	21 ÷ 7 = 3	24 ÷ 8 = 3	27 ÷ 9 = 3
24 ÷ 6 = 4	28 ÷ 7 = 4	32 ÷ 8 = 4	36 ÷ 9 = 4
30 ÷ 6 = 5	35 ÷ 7 = 5	40 ÷ 8 = 5	45 ÷ 9 = 5
36 ÷ 6 = 6	42 ÷ 7 = 6	48 ÷ 8 = 6	54 ÷ 9 = 6
42 ÷ 6 = 7	49 ÷ 7 = 7	56 ÷ 8 = 7	63 ÷ 9 = 7
48 ÷ 6 = 8	56 ÷ 7 = 8	64 ÷ 8 = 8	72 ÷ 9 = 8
54 ÷ 6 = 9	63 ÷ 7 = 9	72 ÷ 8 = 9	81 ÷ 9 = 9
60 ÷ 6 = 10	70 ÷ 7 = 10	80 ÷ 8 = 10	90 ÷ 9 = 10
66 ÷ 6 = 11	77 ÷ 7 = 11	88 ÷ 8 = 11	99 ÷ 9 = 11
72 ÷ 6 = 12	84 ÷ 7 = 12	96 ÷ 8 = 12	108 ÷ 9 = 12

Linear Measure

12 inches	= 1 foot
3 feet	= 1 yard
$5\frac{1}{2}$ yards (or $16\frac{1}{2}$ ft.)	= 1 rod
320 rods	= 1 mile (statute)

Square measure

144 square inches	= 1 square foot
9 square feet	= 1 square yard
$30\frac{1}{4}$ square yards	= 1 square rod
160 square rods	= 1 acre
640 acres	= 1 square mile

Liquid Measure

4 gills	= 1 pint
2 pints	= 1 quart
4 quarts	= 1 gallon

Dry Measure

2 pints	= 1 quart
8 quarts	= 1 peck
4 pecks	= 1 bushel

Weight

16 ounces	= 1 pound
100 pounds	= 1 hundredweight
2000 pounds	= 1 ton

A long ton weighs 2240 pounds.

Counting

12	= 1 dozen
12 dozen	= 1 gross
12 gross	= 1 great gross

A score = 20

Time

60 seconds	= 1 minute
60 minutes	= 1 hour
24 hours	= 1 day
7 days	= 1 week
365 days	= 1 year
366 days	= 1 leap year

September, April, June, and November have 30 days each. February has 28 days. In leap years it has 29 days. The other months have 31 days each.

United States Money

10 mills	= 1 cent
10 cents	= 1 dime
10 dimes	= 1 dollar
10 dollars	= 1 eagle

INDEX

Addition
The Combinations, 2, 3, 6
Missing Addend, 4, 6, 27
Serial Addition, 8, 9, 10, 12, 14, 15, 18, 19
Two and Three Figures, 23, 24
Review and Drill, 80, 81, 82, 83, 84, 158, 159, 232
Addition and Subtraction, 39, 88, 93
Addition without a Pencil, 231
Problems, 5, 11, 25, 26, 85, 161
Addition of Fractions, 252, 253, 254
Analysis, 11, 32, 45, 47, 50, 99, 112, 125, 163, 182, 239, 270, 271
Arabic Numerals, 1, 20, 21, 22, 155, 226

Business Problems, 279–280

Cancellation, 268

Division
Development of Division Facts, 63, 64, 65, 66, 67, 68, 107, 108, 110, 111, 113, 120, 121
Review of Division Facts, 176
The Missing Factor, 107
Review and Drill, 109
Two or More Figures in the Dividend, 114, 115
Drill in Carrying, 116
Division with Remainder, 179, 180, 181
Division with a Divisor Ending in Zero, 183
Short Division with Carrying, 118, 236
Long Division, 184, 185, 186, 187, 188, 190, 191, 240, 241, 242, 243
Dividing Dollars and Cents, 237
Problems, 112, 123, 124, 125, 182, 238, 239, 244
Division of Fractions, 267
Drill Tables, 292–293

Estimating Answers, 278
Everyday Use of Numbers, 62–173

Factors and Product, 129, 130, 168, 169
Fractions
Development of Fractions, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 245, 246
Addition, 247, 252, 253, 254
Subtraction, 255, 256, 257, 258, 260, 261, 262, 263
Multiplication, 266
Division, 267

Games and Devices, 302, 303, 304, 305
Gain or Loss, 92
Garden Problems, 48

Home Problems, 132, 133, 134, 135, 136, 137, 217, 218, 219

Least Common Denominator, 251
Least Common Multiple, 250

Making Change, 138
Making Problems, 91
Measures
Linear, 69, 70, 208, 274
Weight, 71–211
Liquid, 72–210
Dry, 73, 209
Tables, 307–308
Problems, 131, 275, 276
Mental Tests, 74, 75, 76, 89, 100, 126, 128, 141, 142, 143, 144, 220, 221, 222, 223, 277, 281, 282, 283, 284, 285

Multiplication
Development of Multiplication, 42, 43
Development of Multiplication Facts, 44, 46, 47, 56, 57
Relation to Addition, 49, 50
Drill in Carrying, 51, 59, 96
Special Combinations, 60
The Missing Factor, 97
Multiplying by Ten or a Power of Ten, 100
Drill, 167, 172, 174, 235
Problems, 45, 48, 54, 55, 61, 99, 102, 103, 105, 171
Multiplication Table, 306
Multiplication of Fractions, 266

One Hundred Record, 290

Prime Factors, 178
Problems, Reading of, 270, 271, 272
Problems of Business, 279, 280
Problems with Numbers Omitted, 140, 273
Projects, 132, 133, 134, 135, 136, 137, 217, 218, 219

Reading and Writing Numbers, 1, 20, 21, 22, 155, 226, 227
Reading Problems, 270, 271, 272
Reduction of Fractions, 251, 252
Review, 53, 106, 126, 127, 128, 170, 175, 189, 265
Roman Notation, 41, 156, 228

Sales Slips, 165, 166
Short Written Tests, 269, 277
Solving Problems, 212, 213, 214, 215, 216
Standardized Tests, 147, 148, 149, 150, 151, 152, 153, 154, 294, 295, 296, 297, 298, 299
Subtraction
The Missing Addend, 4, 6, 27, 28, 29, 30
Drill and Review, 31, 86, 87, 89, 90, 162, 234
Subtraction without Carrying, 33, 34
Subtraction with Carrying, 35, 36, 37, 38
Subtraction without a Pencil, 283
Problems, 32, 163, 164
Addition and Subtraction, 39, 88, 93
Subtraction Methods, 300–301
Subtraction of Fractions, 255, 256, 257, 258, 260, 261, 262, 263

Tests of Accomplishment, 77, 78, 79, 145, 146, 224, 225, 286, 287, 288, 289
Time, 40

United States Money, 135, 157, 235, 237